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PHYTOPHAGOUS INSECTS WITH PHYTOSANITARY QUARANTINE STATUTE IN ROMANIA

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SUMMARY
In this paper is presented the phytophagous insects with phytosanitary quarantine statute in Romania (reglemented) and some which haven't quarantine statute (unreglemented) but which are important pests. The reglemented phytophagous insects may be grouped as: reglemented introduced at import/export and reglemented forbidden at import/export. The reglemented phytophagous insects introduced at import/export are: Diabrotica virgifera virgifera Le Conte (Coleoptera, Chrysomelidae) and Helicoverpa armigera Hbn. (Lepidoptera, Noctuidae). The reglemented phytophagous insects forbidden at import/export are: Daktulosphaira vitifoliae Fitch. (Homoptera, Phylloxeridae), Liriomyza trifolii Burgess and L. bryoniae Kaltenbach (Diptera, Agromyzidae).

KEYWORDS: phytophagous insects, phytosanitary quarantine, important pests, Romania

According to the phytosanitary legislation that is valid in Romania – in agreement with the phytosanitary U. E. Office – the phytosanitary insects, which are pests for plants and for vegetable products, may be grouped as: reglemented phytophagous insects (of quarantine) and unreglemented (nonquarantine).

A. The reglemented phytophagous insects, are included in two annexes, namely annexes I and II, each having two sections.

- In the first annex, section two are included the reglemented phytophagous insects (of quarantine), which are known to appear in Romania and introduced at import/export, these being two per all and describe below (1-2).

1. *Diabrotica virgifera virgifera* Le Conte (Coleoptera, Chrysomelidae). Western warm of corn's root, native from North America, "landed" on the fields near Belgrad airport (Serbia-Muntenegru Republic) in 1992 (Bača, 1993). The apparition and spreading of this species in our country's territory was a major and imminent danger, deed pointed out by Perju (1995) and Pălăgeşiu (1995). After only two years, this insect spread on the territory of the neighbour countries and in 1996 was mentioned in our country, too (Vonica, 1996). In the next years the insect reached on the territory of more districts from which: Timiş, Arad, Caraş-Severin, Olt, Dolj, Sibiu, Sălaj, Cluj, Mureş, Bistriţa-Năsăud, Bihor, Satu-Mare (Cean, 2004). It is an oligophagous insect, as an adult; it eats different plants from Poaceae family, but the larvae are developed and reached the full development only on corn plants and eventually on some Curcubitaceae species. The adult insects eat the males and females inflorescences but the damages, if are evident, aren't significant. The larvae eat the unripe root of corn plants in growth. One population from over 3 larvae/plant may become harmful. The harmed plants folded in typical mode (like a crutch) or just fall down. This insect make major damages, the badly infested crops (having over 10 larvae/plant) can be compromise (Bărbulescu, 2000; Grozea, 2003; Vâlsan, 2004).

2. *Helicoverpa armigera* Hbn. (Lepidoptera, Noctuidae). The capsules, or the fruits caterpillar. About the species statute of this insect the researchers still have to talk about. In the scientific literature is considered to be a complex species, with subspecies and forms (Rákosy, Goia & Kovács, 2003). It has about the same behaviour as the American species *H. zeae*. *Helicoverpa armigera* Hbn. is spread in all our country regions, especially in South. This insect is considered like native species. Data about its appearance in large populations and making great damages we can meet frequently in our speciality literature, *Helicoverpa armigera* Hbn. being considered an important poliphagous pest. The larvae from the two generations prefer the

reproduction organs: the corn cob's grains, the seeds from inside of pepper, tomatoes, eggplants etc (Perju, 1999).

This species are more known in our country fauna producing great damages to the corn's crops (Manolache & Tuşa, 1956). In the last years, especially in 2004, the insect damaged for the first time the crops of sunflower from the South zone (Bărăgan, Dobrogea) and the West zone (Banat).

In some time the damages were extended from corn and sunflower crops at those from vegetable (pepper and tomatoes). Also, the insect damaged in significant mode the tobacco crops, especially their inflorescences (Nicolescu, 1999).

- In the second annex, section two are included the reglemented phytophagous insects (of quarantine), which are known to appear in Romania and forbidden at import/export, these being three per all and describe below (3-5).

3. *Daktulosphaira vitifolii* Fitch. (Homoptera, Phylloxeridae). The grapes phylloxera, is native from America from where was introduced in European countries being mentioned in the French's vineyards in 1865. In literature is saying that the insect was mentioned in Europe for the first time in Germany, starting with 1820, in vineyards situated near Bremen (Knechtel & Knehctel, 1909). In our country this insect was found out in Transylvanian vineyards by Szanisló in 1880, but in the majority publications is mentioned the year 1884, when the damages were found out in vineyard Dealu Mare, Prahova district (Knechtel & Knehctel, 1909). With all made measures and elaborated legislation, the insect spread in all our country (Boguleanu, 1988). Through forms presented by this insect –gallicol and radicicol– it infested the leaves and the roots. On the lower face of infested leaves appear characteristic gall and on the roots appear gall like a bill of bird. The harm made by both forms contributes to plants death, and to crops' killing, founded on indigenous

vineyard. The graft of the noble sorts on resistant graft-bearers (*Vitis riparia, V. berlandieri, V. rupestris*) saved from disaster the European viticulture (Nicoleano, 1891).

The commerce with material for planting, from a continent to another and from a country to another, is propitious for the spreading of phylloxera in other new areas, too. So, the maintenance of this species on the list of quarantine pests is justified, being present in Annex II, Section 2, like phyto-sanitary quarantine organism, in CE countries inclusively in Romania.

4. *Liriomyza trifolii* Burgess (Diptera, Agromyzidae). The greenhouse plants' miner fly, was mentioned for the first time in Romania in 1981, harmed the forced crops from hothouses placed near Bucharest (Deheleanu & Macedon, 1981). According to Szekely (1986) the insect was signaled beginning with 1970-1972, harming the plants from greenhouse in Cluj and Braşov (Codlea). It is a poliphagous species, signaled on 22 species of plants, preferring the species of Asteraceae family, but great damages makes to crops of chrysanthemum and gerbera, as well as tomatoes, cucumber, bean and etc. The adult insects feed with the cell juice from leaves and with the flowers' nectar, too. Through the orifices made with the ovipositor for egg deposition, the insects feed with appeared juice. The harmed plants are infested with virus transmitter microorganisms. The larvae gnaw typical mines in the leaves and in petiole. The great harmed leaves dye early (Szekely, 1986).

5. *Liriomyza bryoniae* Kaltenbach (Diptera, Agromyzidae). The tomatoes' leaves miner fly, native from Meridian European countries spread in Extreme Orient and USA. In our country was signaled as synonym name of *L. solani* Macq by Lemeni (1969) and *L. solani* Kittel. by Mihăilescu (1983), In both case harming the leaves of tomatoes' plants, in greenhouses and solariums conditions. The insect have the body of 1.5-2.3 mm length, being green-like and having yellow abdominal tergits, on their lateral parts. The others development stages – larva and pupa- are similar as the *Liriomyza*

trifolii Burges. Moreover the biological parameters are similar as the hothouse plants' miner fly (*L. trifolii*). We recommend the usage of the same preventive and control measure like in case of greenhouse plants' miner fly.

B. The unreglemented phytophagous insects (nonquarantine), which are more numerous and more or less harmful for the plants and for the vegetable products from all sectors of agricultural production, in open field or in protected places.

- A special attention must be given to that species from this category which previous had a phyto-sanitary quarantine statute, as: the louse with skull from San José (*Quadraspidiotus perniciosus* Comst.), the louse with wool (*Eriosoma lanigerum* Haussm.), the beetle from Colorado (*Leptinotarsa decemlineata* Say), the bean seed-beetle (*Acanthoscelides obsoletus* Say), the peach tree striped moth (*Anarsia lineatella* Zell), the oriental moth of fruits (*Grapholitha molesta* Busch.), the Mediterranean fly of orange and lemon (*Ceratitis capitata* Wied.) etc.

- None of the phytophagous insects shouldn't be ignored from this category which didn't have phyto-sanitary quarantine statute, but which frequently appear in dense populations and put in danger the crops production and that of vineyard and fruit trees plantations. From this category we should mention: the cereals bed bug (*Eurygaster spp.*), the wire worms (*Agriotes spp.*), the white worms (*Melolontha melolontha* L.), the weevil of beet (*Bothynoderes punctiventris* Germ.), the weevil of stored produces (*Sitophylus spp.*), piercing of maize (*Ostrinia nubilaris* Hb.), the caterpillar of steppe (*Loxostege sticticalis*), the owl of sowing (*Scotia segetum* Denn. Schiff.), the owl of cabbage (*Mamestra brasicae* L.), the moths of vineyard (*Polychrosis botrana* Denn. Schiff. and *Eupoicilia ambiguella* Hb.), the seeds' plum tree wasp (*Eurytoma scheineri* Schr.), the fly of cherry (*Rhagoletis cerasi* L.) etc.

CONCLUSIONS

- In the current paper we present 5 species of phytophagous insects that have phyto-sanitary quarantine statute in Romania: *Diabrotica virgifera virgifera* Le Conte *Helicoverpa armigera* Hbn., *Daktulosphaira vitifoliae* Fitch., *Liriomyza trifolii* Burgess and *L. bryoniae* Kaltenbach.

- We mention also some phytophagous insects that had been once and some that didn't have phyto-sanitary quarantine statute, bat that are important pests.

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THE ROTATION PROPERTIES OF ENGINES WITH GASOLINE INJECTION

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Keywords: gasoline, injection, effective power, revolution.

*Abstract: **In this paper we will deduce:** the characteristic from number of rotations at all load, the characteristic from number of rotations at partial load, the combustible consumptions at totally task, the combustible consumptions at partially task*

The equipment

From on the object to take proceeding against principals trial are: from adjust, from taking over, from inspection testing and control, specials trials, standard and from investigation.

The trials from investigation is make with object from has to work out different problems referring to thermal process, changing from gas, to working mechanism, user materials from construction, and from exploitation or from strength indication stabilization, in seeing engines perfecting existing and new engines realization. The equipment for to try are constituted by: sample stall equipped with apparatus and the feeding devices with fuel and coping water, the pipeline of the gases evacuation, apparatus and devices for the measurement's effectuation.

The equipment for to try of the engine with fuel injection is made by: figure 1

-foundation with a plate and a frame, on wick it is fixed the equipment for to try;

-the engine feeding system with consumption and the devices wick to allow -the determination of the consummated combustible quantity;

-the engine's starting system;

-the evacuation system of the burned gases and of the damping of the sound;

-the system for of the oil, air's delft and water's delft consumption;

-apparatus for the measure of temperature of pressure etc.

-the equipment for to broke, wick can be either hydraulic or electric;

The equipment from the figure 1 is equipped with the equipment for the brake, achieved through the using of an electric machine of turbionar's type W13S- Germany, currents and the equipment for to retrieve of the brake's energy.

The equipment mentioned offer the testing possibility of the engines in practiced condition of the recovering of the brake's energy and the introduction of it in the national energetic system and assures the necessary technique conditions for the execution in automatic condition of the testing procedures through the using of a process calculator.
The acquisition system totality 32 measure lines of the pressure, of the rotation, of the engine couple, of the indicated diaphragm of the atmospheric parameters. The acquisition ant the dates processing is made in an automate conditions under (the leader ship) a processes calculators leader ship which is endowed with a special program (soft ware) set for the command's emission necessary for the evidence's execution carried out in the testing proceeding and for the automatic processing of the recorded dates in the moments to try.
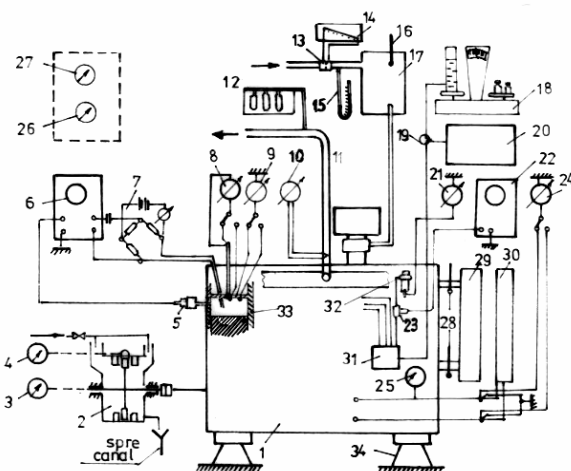
Figure 1. The equipment for to try of the engine with fuel injection: 1-engine; 2-electric brake; 3-tahometer; 4-dial with the brake's indication; 5-piezoelectric sound; 6-oscilograph; 7-apparents for the measure of the gases temperature in the cylinder; 8-piezoelectric pyrometer to measure the valve's temperatures; 9- piezoelectric pyrometer to measure lid cylinder's; 10- piezoelectric pyrometer to measure the temperature in the evacuation's gallery; 11- the evacuation pipe line; 12-gases analyzer; 13-dyaphragm; 14-micrometer; 15-manometer with liquid; 16-thermometer; 17-the tank for air; 18-device for to measure the

combustible's debit; 19-tap for 3 ways; 20-tank; 21- piezoelectric pyrometer for measure the temperature at the injector; 22-oscilograph; 23- piezoelectric sound for to measure the injection's pressure;

 24- piezoelectric pyrometers for to measure the oil's temperature; 25-manometru for oil; 26-thermometer for the environment's temperature; 27- barometer; 28-thermometer for the cooling water; 29-radiator for water; 30radiator for oil; 31-feeding electric pump; 32-injector; 33-the engine's cylinder; 34-the engine's support au foundation.

The testing presentation

At the engines stall have been brought in order to try a Mono-Motronic injection system engine type 106-20 equipped with carburetor 28/30 DCI. The injection's and lighting map drawings used at the engine with fuel injection expert meted by the author constitute some networks of characteristics with are put in the memory under the numerical form into an electronic module. They do not alter net much on the whole duration of the engines work-ink.

The electronic variation of the advance at the lighting has two important advantages the relative information to the revolution speed is directly taken from the shaft engine thank to in inductive sound with a highly precision of measure and the using of a map drawing allows to obtain adjustment of the advances angle at the lighting.

The testing have carried on retiring to the followings the engines running in; the determination of the dynamic and of consumption's performances according to STAS 6635/87 and SR ISO 1585/1998 and the carburetor variant; the determination of the STAS 6635/87 and of the combustible consumptions performance according to; in the fuel injections variant; the comparison of the obtained results in the two equipment variant presented in the figures ,2,3,4 and 5.
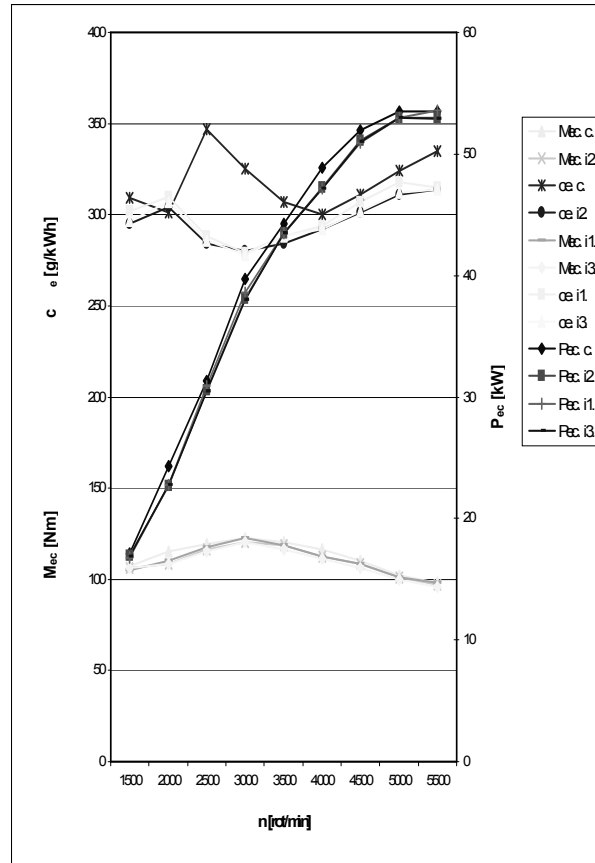
Figure2.The rotation characteristics at totally task. Engines type 106-20.
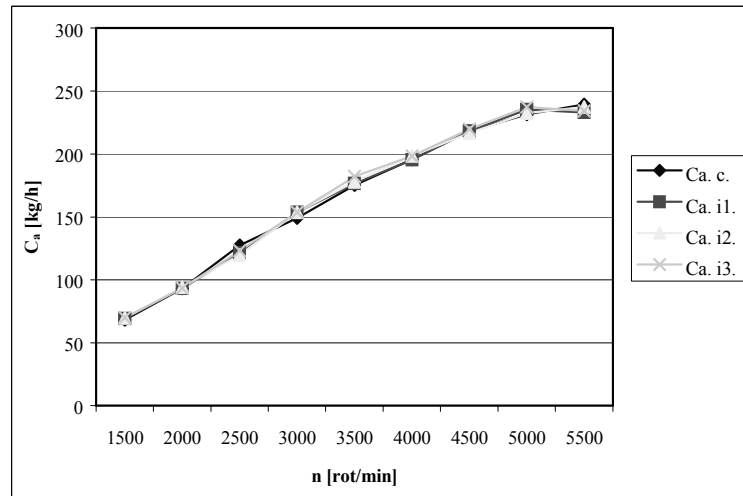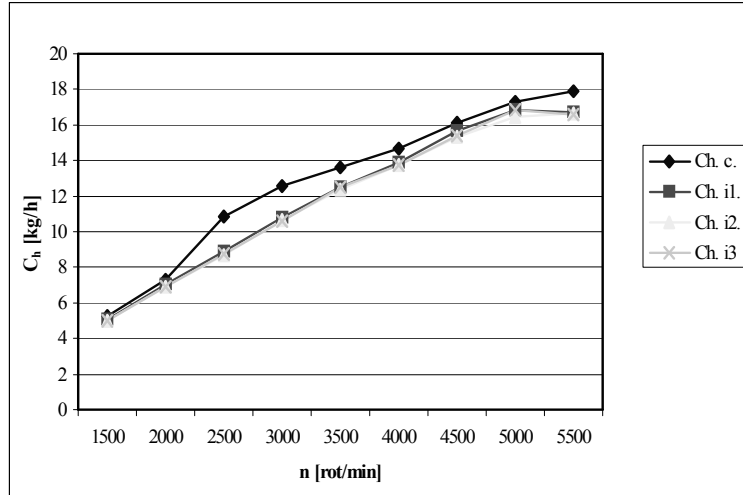
Figure3. The combustible consumptions - Engine type 106-20 -totally task.
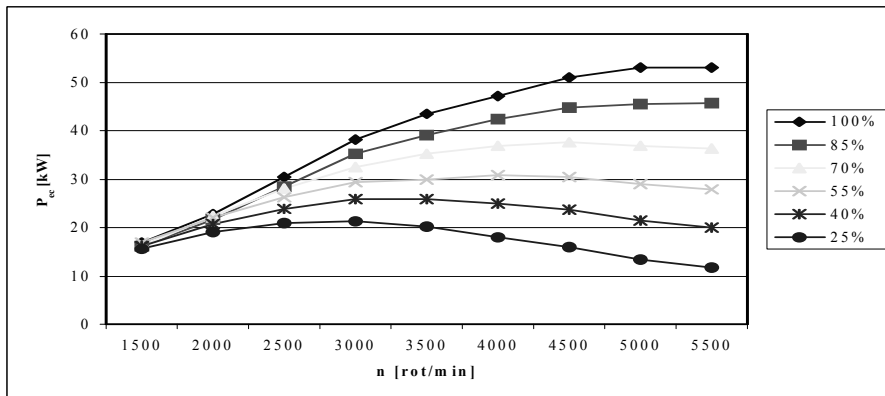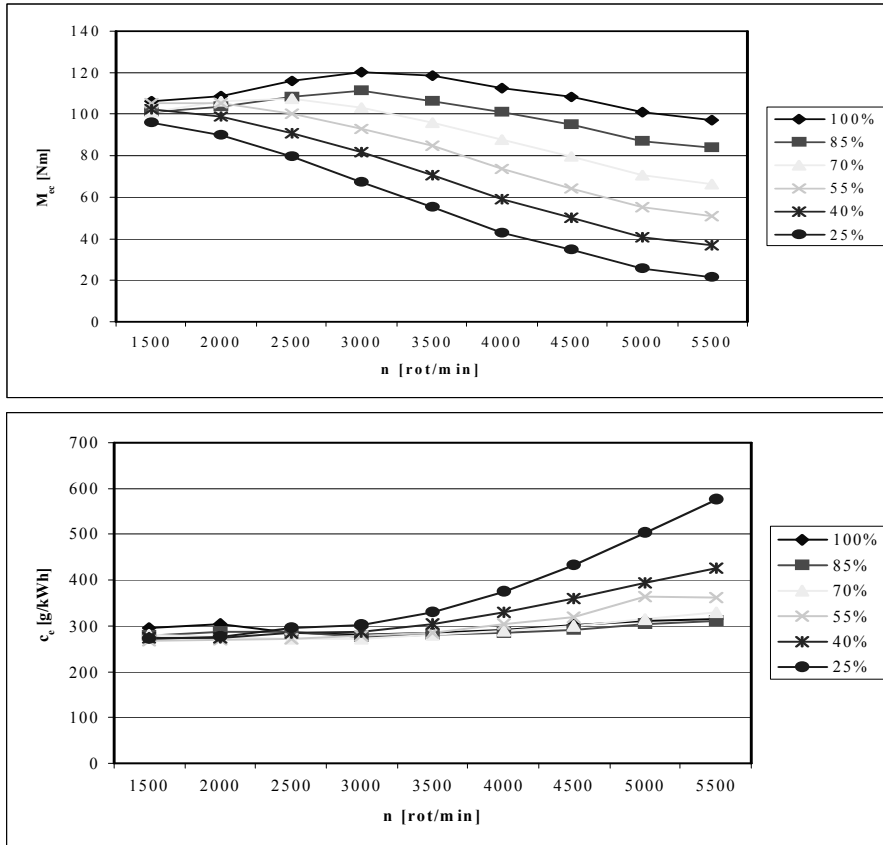
Figure 4. The rotation characteristics at partially task. Engines type 106-20 with engine injection.
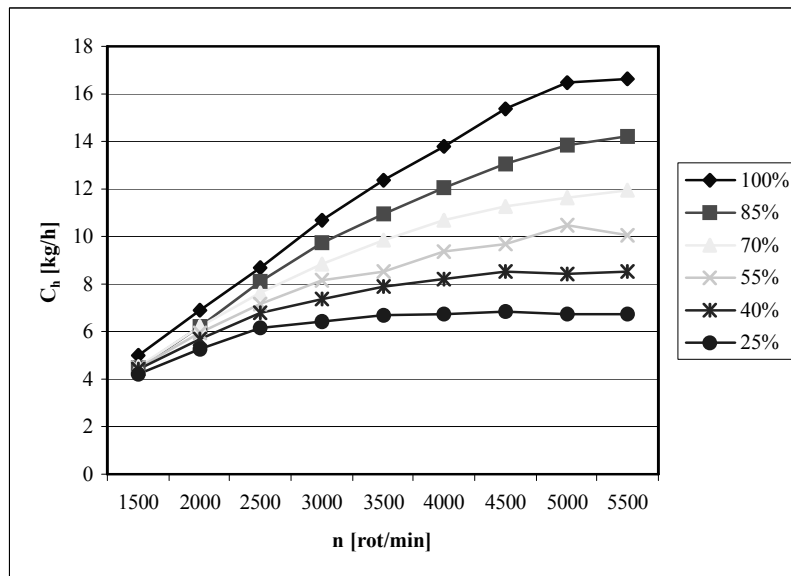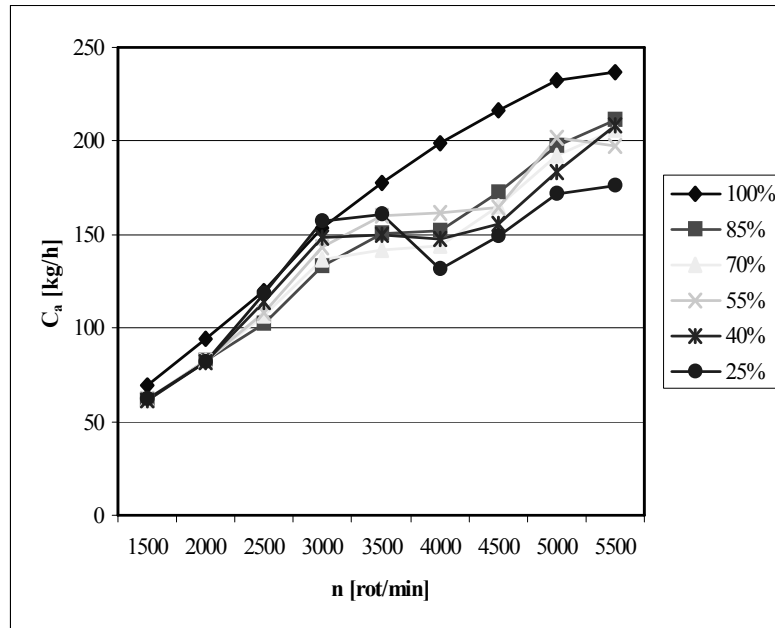
Figure 5. The combustible consumptions - Engine type 106-20 - at partially task.

Conclusion

For the equipped engines with the model supposed by the author, have been raised up on the engine stall, the main characteristics for the injections times, the angle of lighting at totally and partially task and the enrichment's coefficient at the totally task which are presented.

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THE SPECIFIC FUEL CONSUMPTION VARIATION OF A CERTAIN ENGINES WITH GASOLINE INJECTION

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Abstract: *Working system of engine is definite by rotation and load, but besides those, it requires knowledge about thermal system, that is machine part temperature situation, the temperature of cooling fluid, admitted air temperature, evacuation gases temperature height corrections.*

Engine load suits effective power P_e delivered by engine to a certain rotation. The load is regulated through speed pedal, controlling Mono-Motronic mixture quality system and air quality of other systems. Outside engine action applied of consumer (motor vehicle or brake trying on trial engine stand) represent engine attempt when thermal system of the engine doesn't vary in time, working system is stabilized, contrary the engine is working in provisional system.

Keywords: gasoline, injection, effective power, revolution.

The general model fuel injection model

Load remark maybe realized through comparison between effective power P_e and continued effective power P_{ec} developed on the some rotation, named load coefficient $\chi = P_e/P_{ec}$ [2];[3].

Through continued effective power it can be understand maximum value of power, which can be developed by an engine permanently, at a named rotation, without modification of engine indexes and without appearance of some wear defections. For short lapse of time (for example 15 min. for one hour interval) the engine can develop a superior power, named intermittent superior power P_{ei}. Maximum continuously power settled by industrial unit engineering is the nominal power Pen, and adequate/suitable rotation, nominal rotation.

The load according power P_{ec} ($\chi = 1$) is named complete load the one according P_{ei} power absolute load and according idly running $P_e = 0$ (theoretical $\chi = 0$) null load.

Between null and complete load ($0 < \chi < 1$) is partial load area, and between complete load and absolute load ($1 < \chi < 1,1$) is overloads area.

Mixture quality, respective air and fluid amplitude, named dosage express by dosing coefficient: $d = C_c/C_a$ where C_c is fuel quantity resulted in the mixture and C_a – air quantity when air quantity resulted in the mixture is the minimum necessary one for theoretically complete burnt of fuel dosage being named theoretical. When air quantity is lower than the one according theoretical dosage, mixture is poor.[2].

Mixture quality estimate is done frequently by air excess coefficient x, definite by report $\chi = L/L_o$, where L means air quantity which is available for burning one kilo fuel, and L_o is minimum quantity of air available to burn one kilo fuel.

For stoechiometric dosage $\chi = 1$, for poorest one $\chi > 1$ and for the richest $\chi = 1$.

Block scheme of general model used modulate gasoline injection system of M.A.S. is presented by figure 1.[3].
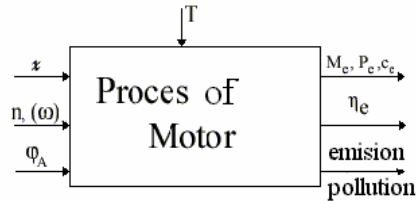
Figure 1.Block scheme of general model of spark ignition engines

It includes correlation system of aspirated air by engine with a quantity of gasoline injected on cycle. Entering magnitudes into the system are x load, n rotation, angular speed, position of obturator and the emergence one are effective moment, effective efficiency, effective consummation, polluting emission. Engine process is influenced by thermal system of T engine.

Following the study made for many different fuel injection systems it can be noticed that every system no matter that it is a mechanic or electric one, they have basic scheme, based on internal burning engine working. Mechanic systems have on their principle scheme base two circuits: fuel circuit, air circuit and: suitable correction.

Electronic systems includes, beside that, the electric circuit and firing circuit for Motronic system.[4]. The main injection equipment load is correlating air quantity aspirated by the engine with quantity of injected fuel on the cycle, such that may result the best dosage every engine working system. That can be possible with correlation between air and fuel quantities and a series of engine working parameters (air, pressure, into the collecting input obturator position), engine rotation.[1];[5].

Figure 2 represents three dimensional variations effective power of 106-20 engine with Bosh Mono-Motronic MA 1.7 gasoline injection and, figure 3 represents three dimensional variation of specific effective fuel consume of the same typo of engine, fit with the same injection system.
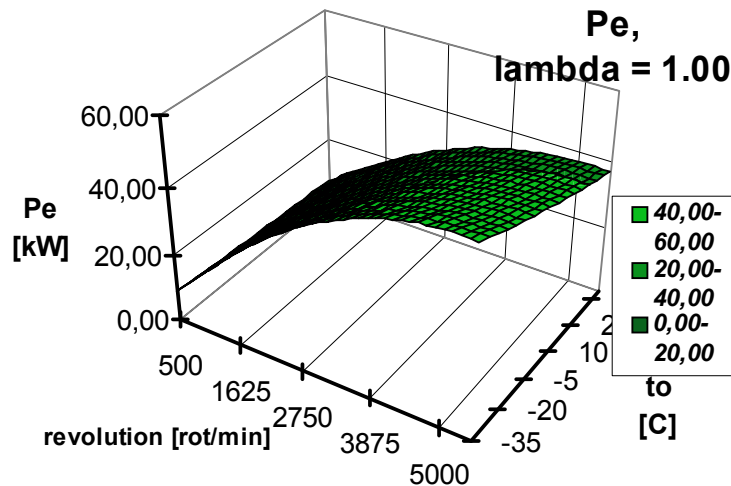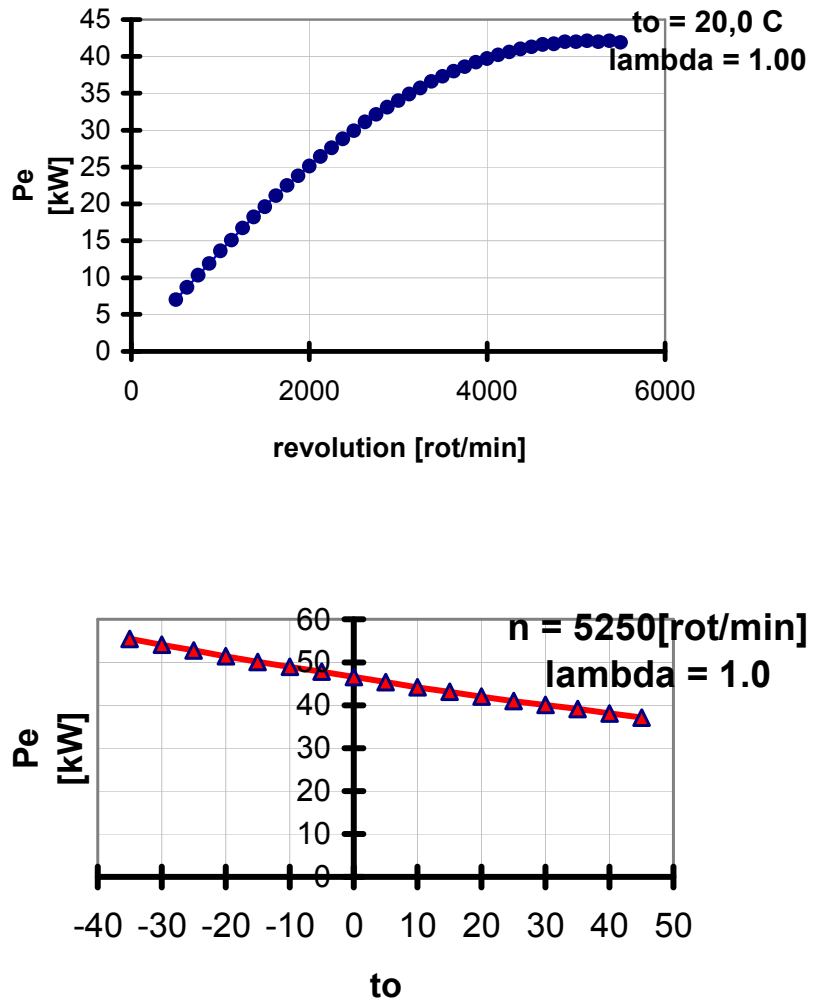
Figure 2. Variations effective power of 106-20 engine with Bosh Mono-Motronic MA 17 gasoline injection
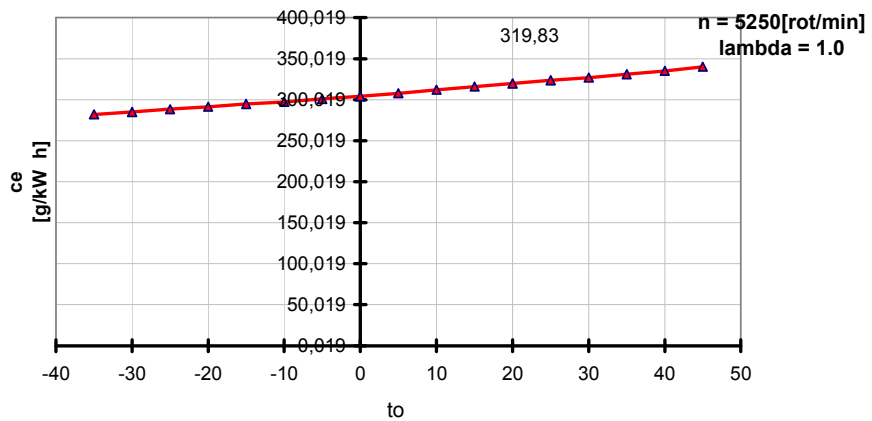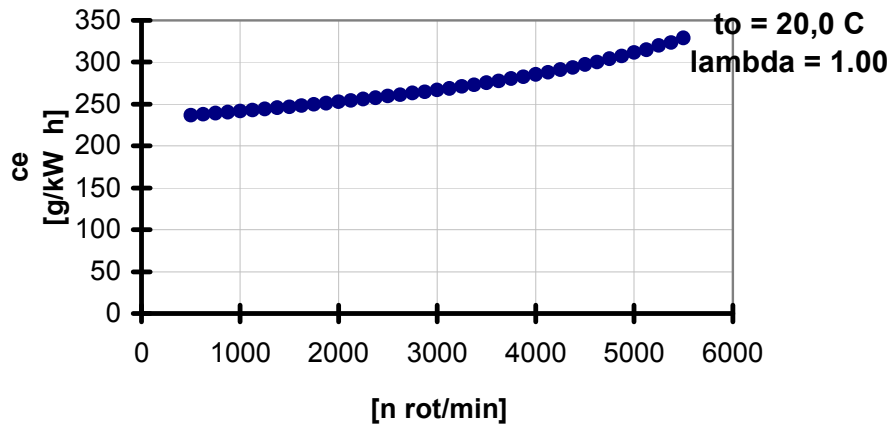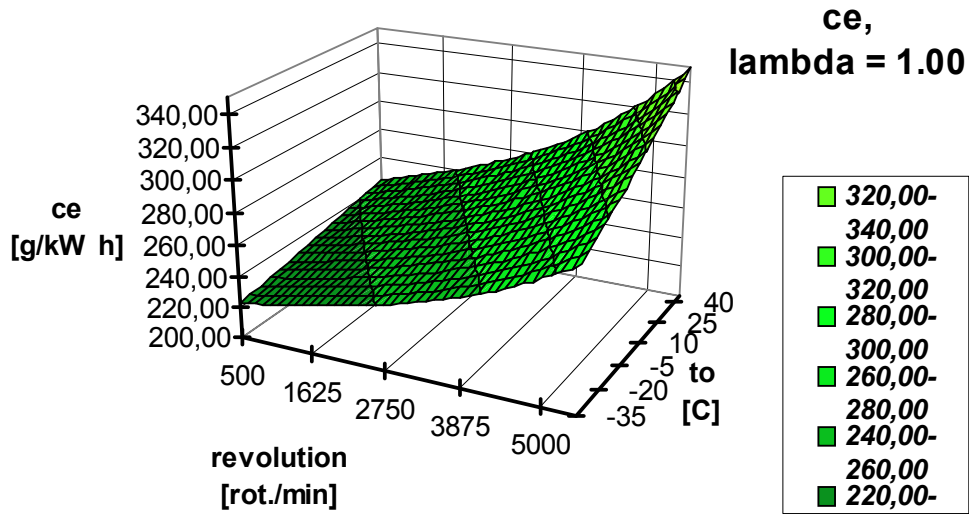
Figure 3. Variation of specific effective fuel consume of 106-20 engine with Bosh Mono-Motronic MA 17 gasoline injection

Quantity of air aspirated by engine can be expressed after enumerated functional parameters must to count on injection pressure, flowing section through injector and injection length.

Often it is prefer that opening length of electromagnetic injector to depend on depression from the input collector, because quantity of injection is correlating with quantity of air aspirated on the cycle with, as it is known from injection mechanic.

Equipment's are after depression from admitted collector dependence of rotation is smaller in this case following to be done rotation corrections for working systems witch demand such corrections. Flowing corrections of injected gasoline into cylinder are demanded for a succession of transitory system of enfin working, cooling start, cooling liquid temperature, lubrication oil temperature atmosphere pressure.

Accounting all those, to realize injection equipment's it must be applied the fundamental principle, graphically the gasoline from the tank and represses it to electromagnet injectors. Gasoline pressure upstream injectors are constantly mentioned with a pressure regulator, which allows the return to reservoir of gasoline excess suppressed by supply pump.

Electromagnetic injectors associated to each engine cylinder, are opened once a cycle (of one cameo shaft rotation) by stream impulses proceeded from a computer. Control impulse length depends on depression from impute collector, engine rotation and a series of other correction dimensions.[5].

Conclusions

Those dimensions are perceived with electro-mechanical translators help, being transmitted to the computer like electrical dimensions. On this basically principle can be modeled an important variety of respond to demanding of performance increase of engines, dominating affective consumption of fuel and polluting emission factors from evacuation gases as much as necessity encumbering and adaptability.

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STUDIES AND RESEARCHES ON TRACTOR ENGINE PERFORMANCES

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Abstract: *The paper presents different aspects concerning the typical engine performances obtained through many tests: drawbar performances, three –point hitch test, maximum power and fuel consumption. The aim of the research is to improve part-load power performance and increasing the efficiency of tractor engine.*

Key words: engine performances, drawbar, three-point hitch, power and fuel consumption

1. Introduction

The power performance of tractors is a most important information item needed by the farm machinery manager. The tractor is the base of machinery system, often the most used machine on the farm. The test procedures have evolved over the years to accommodate changes in tractor technology. The tests help evaluate innovations as dual drive wheels, turbo-charges, radial tires, new transmissions and the efficiency of various fuels. As tractor manufacturers developed worldwide markets, a need arose for an international tractor test procedure to avoid redundant tests in each national market.

Each tractor is equipped with the common power-consuming accessories such as power steering, power lift pump, generator, etc. The tractor usually has 50 hours or more of operation to assure the performance has stabilized and is representative of the tractor model.

2. Tractor tests

The engine crankcase is drained and refilled with new oil conforming to the specifications in the operator manual.

Drawbar performances

Maximum drawbar performance is shown for the normal field speed selected by the manufacturer. This performance is determined within the following limits:

- The slip of the drivers must not exceed 15 % for pneumatic tires on the concrete test course or 7 % for steel cleats on the well-packed earthen test course

- The ground speeds must not exceed 16 km/h

- Safe stability limits of the tractor must not be exceeded

Fuel consumption is determined at the manufacturer selected travel speed with the drawbar pull set to give:

- Rated engine rpm

- 75 % of the pull at rated engine rpm

- 50 % of the pull at rated engine rpm

- Maintaining the same load and travel speed by shifting to a higher gear and reducing the engine rpm

Three-point hitch test

Front end ballast can only be provided by a standard weight package and front tire ballast supplied or recommended by the manufacturer.

The tractor is tested on the same rear tires used during the drawbar tests. The front tires of two- wheel drive and front-wheel drive assist tractors may be of any size offered by tractor manufacturer as long as they properly match the rear tires. A quick-attaching coupler is used on all category III and IV hitches and on any tractors on which it is offered as standard equipment.

The concrete power efficiency for tractor is presented in figure 1.

Fuel consumption

Fuel consumption is one of the most important aspects in which farm machinery managers are interested. In table 1 is presented fuel efficiency for some fuels, such as: gasoline and Diesel.
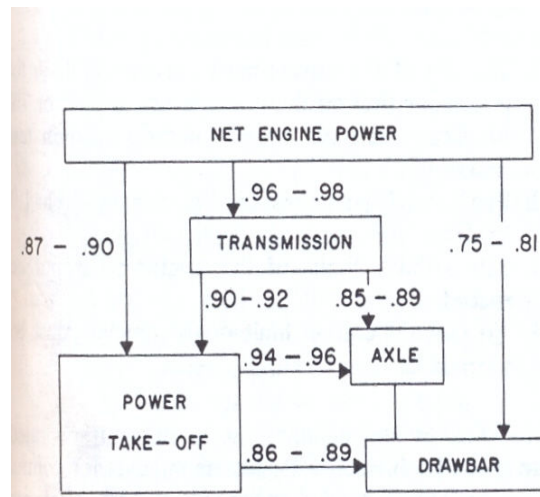
Fig. 1. Power efficiencies for tractor

Table 1

Fuel efficiency

Loading, % max.	Gasoline	Diesel		
		Nat. aspirated	Turbo	Turbo and cooled
100	2,17	2,90	3,07	3,09
80	1,96	2,84	2,82	2,86
60	1,63	2,60	2,55	2,59
40	1,28	2,13	2,10	2,15
20	0,83	1,38	1,36	1,42

Engine oil consumption should not be overlooked. Consumption is defined as the total volume of new oil placed in the engine in a given time period. The recommended oil change periods vary widely.

Power requirements

Efficient power performance includes the selection of implements that neither overload nor fail to use adequately the power available from a tractor or a self-propelled engine.

Field machine power requirements consists of functional requirements and rolling resistance requirements. The functional

requirements are those that relate directly to the processing of soils, seeds, chemicals or crops. Rolling resistance is usually an undesirable parasitic power requirement arising from the necessity for moving heavy machinery over soft field surfaces. Transport wagons have only rolling resistance power requirements. Tillage implements have only functional resistance if their weight is carried on their tooling and is necessary for tool penetration.

Functional requirements depend on soil and crop conditions, which are highly variable. Listed below are the relative drawbar pulls for moldboard plows in different soil types.

Sandy soil   1,0

Sandy loam   1,6

Clay loam   2,3

Clay   2,8

Heavy clay   3,3

Dry adobe   7,8

In addition to soil type, tillage draft varies with soil moisture. The draft of plows is increased if the soil is either too wet or too dry. Minimum draft seems to occur in the moisture range that produces a friable consistence of the soil. Root development, organic matter content and depth of operation provide additional variability.

Conclusions

Tractor engine performances are referring to different parameters, such as: drawbar performances, three-point hitch test, fuel consumption, engine oil consumption and others. An important factor to consider is that of soil type.

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RESEARCHES ON DIFFERENT PARAMETERS OF TRACTOR ENGINE

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Abstract: *The paper emphasizes the tests and researches made on different parameters of tractor engine such as: fuel consumption, engine oil consumption, coefficient of rolling resistance, distribution of tractor power loading.*

Key words: fuel consumption, rolling resistance

1. Introduction

The rolling resistance power requirements are some of important parameters of motor tractor. The expected coefficients of rolling resistance for conventional pneumatic tires used in agriculture that have a tire section width equal to about half the rim diameter. The outside diameter of tires is approximately 90 % rim diameter plus twice their section width.

2. Power requirements

Mounted and semi-mounted implements may have rolling resistance too. If some of the implements weight is carried on the tractor while operating, that weight times the coefficient of rolling resistance for the rear tractor tires is really implement rolling resistance.

Power requirements can be quoted in many different ways depending on the characteristics of the operation and the machine. Quite often a force instead of a power requirements is reported to remove the effect of variations in forward speed. The variation due to different sizes of implements is removed by reporting draft per foot of effective width or per unit or row.

In fig.1 is presented the effect of tire diameter and inflation pressure on coefficient of rolling resistance. In the left portion of diagram from fig.1, at 0,84 m , go vertically (dashed line) to a surface condition of interest (tilled, settled soil line) and then go horizontally left to read 0,14 at 110 kPa inflation pressure. At rated inflation pressures, extra wide tires could have as much as 50 % less rolling resistance on sand and 50 % more on concrete.
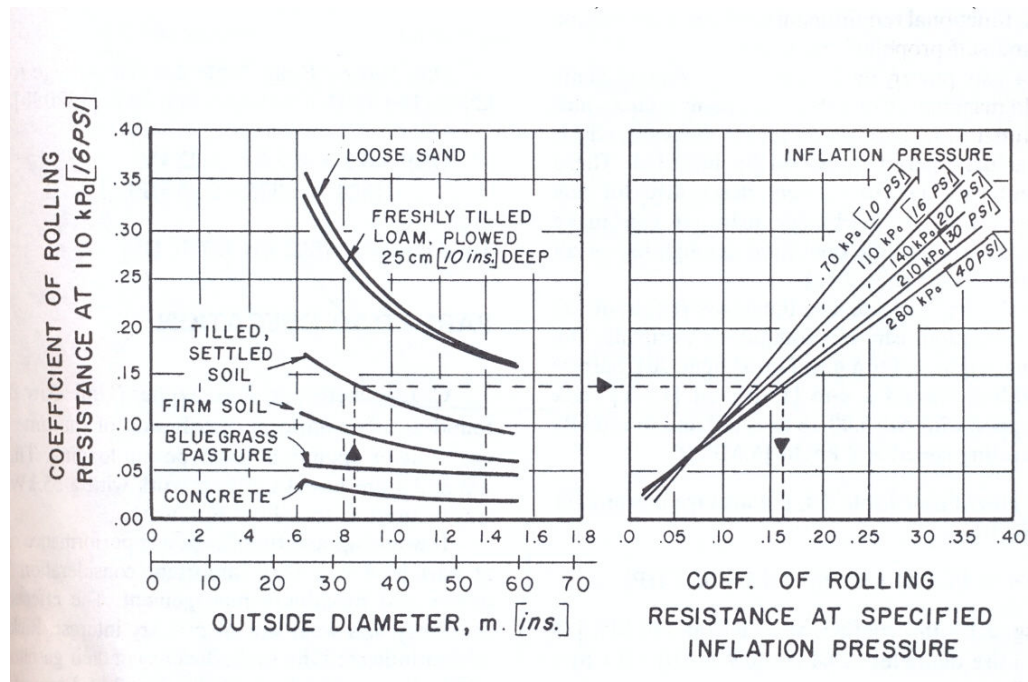
Fig. 1. Effect of tire diameter and inflation pressure on coefficient of rolling resistance

3. Part-load operation

The data from Table 1 refer to an average tractor based on its work with a 35 kW, tractor used in actual on farm work. The power performance of tractor is a very important consideration for good power and machinery management. The affect of fuel efficiency and wear are of primary interest.

Potential fuel economy is demonstrated by considering a partial load of 40 % on the tractor. Studies showed that although there are differences in

individual tractors, considerable fuel savings can be realized by reducing the governor control setting at part loads.

There was discovered a rather uniform distribution of the time a tractor spends at each power loading. In Table 1, data are presented for a tractor with 35 kW (48 HP) used in actual on-farm work.

Table 1

Distribution of tractor power loading

% Maximum power	% Total time
Over 80	16,8
80-60	23,9
60-40	22,6
40-20	17,5
Less than 20	19,2

In Table 2 are presented power, draft and energy requirements for many field machines. Compiled from many sources and including estimates, it attempts to report ranges in which 90 % of all actual operations would be included.

Table 2

Field machinery power requirements at 4,8 Km/h

No.	Machine	Draft, Force per unit width kN/m	Energy or Work kW.h/ha
1	Plow, moldboard or disk in Light soils Medium soils Heavy soils	3,2 5,3 8,5	8,7-17,5 14,6-25,8 22,1-46,1
2	Disk harrow	0,7	2,0-4,0
3	Blade cultivator	4,0	6,9-13

4	Seeder row planter	0,45	1,1-2,4
5	Chemical applicators, NH applicator	5,1-7,3	4,4-6,5
6	Row cultivator Shallow deep	0,6-1,2 0,9-1,8	1,6-3,3 2,4-4,8

Conclusions

The paper follows different aspects and parameters of tractor engine, concerning power requirements, effect of tire diameter and inflation pressure on coefficient of rolling resistance and other measurements and tests in order to improve the tractor power and to decrease the fuel consumption.

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SEED POTATO

RESEARCH CONCERNING POTATO SEED MATERIAL

PRODUCTION, IN VIROSES FREE CONDITIONS

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Abstract

From a phytotechnical viewpoint the potato is an important plant being a completely mechanized crop the leaves the soil weed free; it economically values manure and mineral fertilizers; it reacts with encreased yield when irrigated; it is cultivated in colder highland regions; in specialized areas it covers as crop the whole agricultural territory; it is a good forerunner for for the fall wheat, barley and other crops (BÎLTEANU, 1993).

High altitudes, the existence of natural barriers create natural conditions for isolating crops and therefore reduce virotic desease propagation (BOZEŞAN, 2003). The potato represents for Romania a staple food for the population. The cultivation of potatoes all over the world has proved that with all the varieties by growing them year for year a depreciation of the vegetative system of the plant takes place. Implicitly, continuously and progressively the initial production potential degenerates. VELICAN (1959) in his attempt to elucidate the causes and prevention methods for the potato degeneration establishes three basic theories: ecological, physiological aging and virotical. To diminish the percentage of virus infected plants a better management of phytosanitary methods in producing seed potatoes is of necessity. Besides this also a higher proportion of resistant varieties within the admitted assortment is of importance. With the potato, more than with any other species, the planting material, characterized by its phytosanitarical, biological and physical features, is of paramount importance for constant, quality high rate yields (GOREA et all, 1982. MAN et all, 1984, BERINDEI, 1985).

Scientific Bases for Seed Potato Production and Propagation in Romania

The national system of seed potato production was organized in 1968 into "closed areas" (fig. 1) by the Potato Research and Production Institute, Braşov for 7 countries (MAN et all., 1987).

There were established three areas where potato degeneration occurred intensly (See MAN et all., 1987, MORAR, 1994).

Fig. 1. **Production of potato planting material**
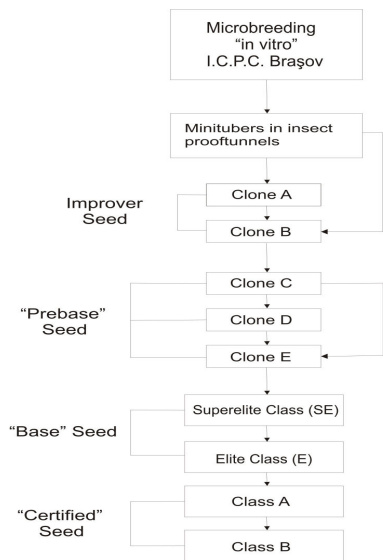
Propagation of Potato Planting Material Outside the Closed Areas

Because the pedoclimatically favorable areas are limited and they cannot provide the seed potato needs for the whole country it becomes obvious that a concept of a system to propagate outside the closed areas is needed. Following the diagram of fig. 4 for closed areas for each country there has been established the amount of clasa A and B planting material.

Reducing the Virotic Disease Infection Degree by Generalisation of the ELISA Test and the Rapid Micromultiplication Procedures

The ELISA test allows a quick tracing of potato viruses in leafs, stems or tubers. Introducing this technique in our country since 1989 leads to a large possibility of control in order to eliminate the virus infected clones from replication.

Rising the seed potato propagation coefficient and reducing the planting rate is a goal with all seed potato producers in the world (EDDOWS, 1971; GRISON et all., 1975; HAGMAN, 1973).

Aim and Object of conducted Research

Considering the importance of the potato crop in the Sibiu area and neighbour regions, as well as the producers tradition we have drawn our attention in research to solve aspects as:

–   providing the complete need of seed potatoes from virus free areas;

–   promoting for cultivation Romanian varieties;

–   improving the zoning of potato varieties according to their resistance to climatic and virotic degeneration.

Object

Our study concerning the seed potato propagation in virus free areas of Păltiniş at 1420 m. has lead our attention to research the possibilities of constituting a closed microzone for the seed potato production and propagation in this area of the Cindrel mountains.

Considering the need to provide potato producers with virus free planting material we have oriented our research towards the following aspects:

- sorting the territory according to virotic deseases infection pressure;
- elaboration of a crop technology to meet the specific area conditions for the seed potato production and propagation;
- using the ELISA test to make to virus diagnoses of the obtained material;
- reducing the quantity of planting material from closed areas by obtaining the biological category class B outside the closed areas;
- determining the resistence variability to virotic and physiological degeneration of an assortment of varieties in the highland area, the Sibiu region and neighbour areas;
- providing the need of planting material, biological category class B for all producers in the highlands area, the Sibiu region and the neighbour areas;
- encreasing the average yield by generalizing biological category class B for food potato crops;
- encreasing crop profitability and consequently an encrease of benefits and profit for the seed potato and food potato producers of these areas.

Biological Material used for Research

According to the fact that a profitable crop needs the choice of an appropriate variety (BOZEŞAN, 2000) we chose:

- 9 new Romanian potato varieties: Robusta, Rozana, Runica, Timpuriu de Brasov, Amelia, Nicoleta, Productiv, Tentant, Dacia;

- 3 older potato varieties, imported and due to qualities still maintained in growing: Ostara, Sante, Desiree;

- as witness to comparing results, we decided for the average rate of the experience.

Research Method

The experiments conducted in order to analize the main factors in determining the phytosanitary and biological value for the planting material we applied completely the technology for cultivating the seed potato and we strictly observed the following technological links:

- the base was the biological category of the planting material for each variety;

- planting has been operated as early as possible;

- density of planting was 65000 plants/ha (70X22 cm);

- the size of the tubers used for planting was homogeneous (45-55mm).

Organisation of Research

In order to analize the possibility of obtaining outside the closed areas of potato planting material with correct phytosanitary and biological value, we organized an experiment in three locations as follows: the base biological category material produced at Braşov is propagated in the agricultural are of Avrig and Sibiu for a period of time of two years in order to obtain the biological categories class A and class B that will constitute the planting material for the farmers. During the experiment we also observed:

The evolution of aphids in seed potato crops in the fields: Păltiniş, Avrig, Sibiu;

Researching the possibilities of seed potato propagation outside the closed areas.

Experiment Technique

1. The experiments concerning the evolution of aphid populations in seed potato crops in the fields had as aim to establish the favourability rate of the area for propagating the potato planting material. At the same time to establish the best moment to break off vegetation of the aphid affected potato in order to limit the attack of viroses from stalk and leaves to the tuber;

2. The experiments concerning the research of possibilities to propagate the seed potato outside the closed areas had as aim obtaining the biological category Class B in areas or specialized farms from the biological material produce dat Braşov and propagated one year at Păltiniş.

Experiment results and discussions

Evolution of the Aphid Populations in the Seed Potato Crops of the Experiment Fields, Păltiniş, Sibiu and Avrig

The research conducted in the period 1999-2003, in the specific conditions of Sibiu county, in the potato crops had the following interests:

1. Monitoring aphid flights from seed potato crops in order to determine the aphidfauna specific for the areas of the experiments;

2. The dynamics of the aphid populations with major interest on the main potato virus vector species;

3. Analyses of the relationship between the dynamics and the size of the aphid populations, specific for each year of the experiment cycle, on the one hand, and the seed potato virotic desease frequency, on the other;

4. The study of ecological conditions influences and determining the biological cycle of the main aphid species as potato virus vectors: *Myzus persicae* Sulzer, *Aphis frangulae* Kalt, *Aphis fabae* Scopoli, *Brevycorine brassicae* L., *Phorodon humuli* Schrank and *Schizaphis graminum* Rondani.

Collecting Aphid Populations in the Seed Potato Crops

Entomological material (aphid) collection has been done simultaneously in all three experiment fields (Păltiniş, Sibiu and Avrig). In these areas yellow pots (Möericke) were placed in the seed potato crops (MÖERICKE, 1962). Species determination has been done by comparison with specialty literature: BLACKMAN, EASTOP (1985).

The growth of Seed Potato Virus Vector Aphids within the Agroecosystem

There is a close correlation between the speed of biochemical processes characteristic of each species and the temperature and this has permitted the formulation of mathematical equations very different from one species to an other. The equation of the temperature constant may successfully contribute to the *explication of the growing, developing, propagating processes and the biological spreading of the species.*

BLUNCK (1914,1923) has elaborated the equation of the temperature constant (K), which he defines as the product between development time (x_n) and the actual temperature (t_n-t_o) this being the same no matter the place of the experiment:

$$K = X_n(t_n-t_o) \qquad\qquad (A)$$

Starting from experiment accurate determinations, with the help of equation (A) we can mathematically express: the inferior biological threshold (t_o) specific for the species as well as the temperature constant (K).

On the basis of the temperature constant for each aphid species we have determined:

- the prolificity threshold (O);   - the regression line constant (C);

- the best temperature threshold (O_1);   - the tropic constant (X);

- the superior temperature threshold (T)   - the propagating equation (γ)
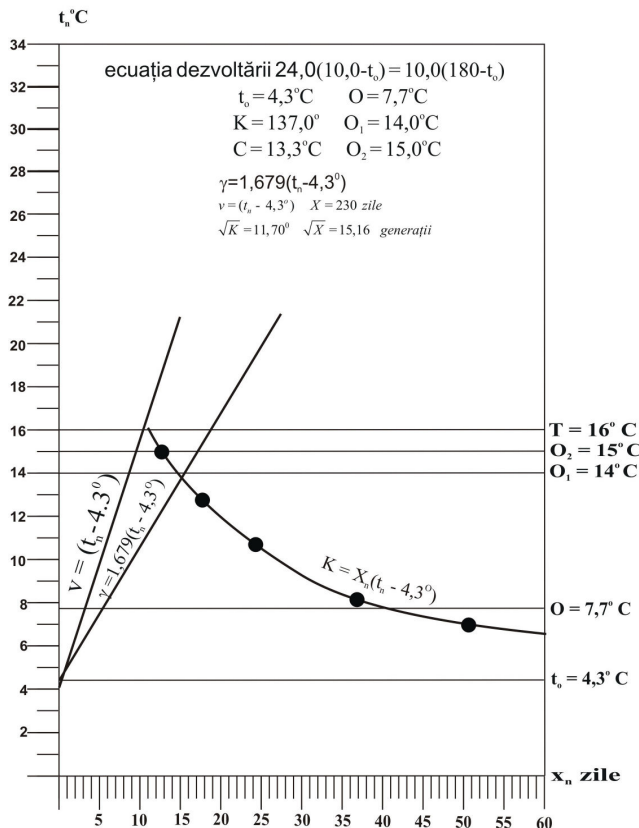
The species biological constant

The paper brings a detailed study and determination of the growth, and propagation constant, the dynamics of species for the following potato planting material viruses vector aphids in the county of Sibiu:

Myzus persicae Sulzer;

The species complex Aphis frangulae Kalt and A. nasturtii Kalt;

Aphis fabae Scopoli ;

Brevicoryne brassicae;

Macrosiphum euphorbiae Hott et Fris.

Fig. 2. **The graphic of growth, development and Propagation of the peach-tree green louse Myzus persicae S.**

Because of the big amount of personal research that is difficult to be resumed in an abstract we give a overview of the material for the *Myzus persicae* Sulzer species, the strongest potato virus vector.

The Constant of the peach tree green louse (Myzus persicae Sulzer) during the experiment period (1999-2003) in Sibiu

The main constants of the Myzus persicae Sulzer are presented in fig. 2.

Table 1 presents the evolution of the peach tree green louse in the period 1999-2003 and as pluriannual average values.

Fig. 2 presentsthe dioecic holocycle of the peach tree green louse in the ecoclimatic conditions specific of the average values of the period of experiments 1999-2003.

From the study of MEIER in Switzerland it results that the higher the altitude the appearance of the Myzus persicae Sulzer species on secondary hosts thus on the potato is delayed with 30 days at altitudes of 850-1000 m. That means that the summer

flight delays up to the 14-15 [th] of July. At altitudes between 1000-1500 m the aphids summer flight begins only on the 15th of August, and at altitudes of 1850 m it delays up to the beginning of September.

Aphid Development in the Păltiniş Area

In mountain conditions aphid development depends on temperature and the existence of primary hosts on which the first part of these aphids holocycle takes place.

According to the research of DRĂGULESCU (2003) in the area of Păltiniş there are no primary hosts to be found for the major part of aphid species.

Our research fully confirm the data presented by MEIER (1958) for Switzerland who showed that the appearance of the Myzus persicae Sulzer species on the secondary hosts and thus on the potato is delayed the higher the altitude.

In the ecoclimatic specific conditions at the altitude of 1420 m in Păltiniş, although there are primary hosts for the *Macrosiphum euphorbiae* Hott et Fris species, the local development is practically impossible.

In this context, from the study of the bioclimatic diagram the propagation of the species Macrosiphum euphorbiae Hott et Fris in the conditions of precipitations and temperature specific for Păltiniş in the year 2003 it results that for this area this species has no proper conditions for growth and development.

Results of Research Concerning the Propagation of Superior Category Potato Planting Material in Virus Free Conditions

Maintaining the phytosanitary standard for the potato planting material propagated at Păltiniş

The phytosanitary quality of the potato planting material is determined by the degree of virotic infection. Therefore a very important aspect in obtaining best planting material is keeping the degree of virotic infections at low level.

Maintaining the phytosanitary standard for the potato planting material propagate dat Sibiu and Avrig

The measures for keeping virotic infections at low level differ according to the manner of virus transmission.

According to the determination of the degree of infection with viruses in the potato planting material propagating lots at Sibiu the certified biological category

(class A) confirms to the standard limits concerning the overall percentage of heavy viruses and the percentage of viruses considered ligh.

Tabelul 1

Annual Dynamics for the Peach Tree Green Louse (Myzus persicae Sulzer), at Sibiu 1999-2003 and pluriannual values

Last spring frost $t_{min}< -2^0C$		Year (period)	Primary Host					Secundary Host										Primary Host		Duration of first frost $t_{min}<-2^0C$	
			F	Fg I	Fg II	Fg III	Fg IV	V I	V II	V III	V IV	V V	V VI	V VII	V VIII	V IX	VS X	S	Dep. ou iarnă		
-2,1	24,03	1999	17.04	10.05	25.05	4.06	13.06	23.06	3.07	11.07	21.07	30.07	9.08	18.08	29.08	11.09	23.09	5.10	15.10	-4.9^{0}C	17.10
-4,5	3,04	2000	16.04	29.04	12.05	25.05	5.06	13.06	23.06	3.07	11.07	23.07	1.08	10.08	19.08	28.08	11.09	24.09	4.10	-4.7^{0}C	20.10
-2,2	4,04	2001	7.04	30.04	14.05	26.05	8.06	18.06	30.06	10.07	18.07	28.07	5.08	14.08	23.08	4.09	20.09	4.10	14.10	-2.0^{0}C	25.10
-3,4	8,04	2002	20.04	6.05	18.05	28.05	10.06	19.06	27.06	6.07	14.07	23.07	2.08	11.08	22.08	2.09	17.09	4.10	14.10	-3.0^{0}C	20.10
-3,7	8,04	2003	29.04	9.05	19.05	30.05	8.06	16.06	26.06	4.07	16.07	24.07	2.08	11.08	19.08	28.08	8.09	6.10	16.10	-5.8^{0}C	19.10
-3,2	4,04	Average 1999-2003	18.04	5.05	18.05	29.05	9.06	18.06	28.06	7.07	16.07	26.07	4.08	13.08	22.08	2.09	16.09	3.10	13.10	-4.0^{0}C	20.10
-2,4	14,03	Pluriannual average	24.04	10.05	23.05	3.06	14.06	25.06	5.07	14.07	23.07	1.08	10.08	20.08	30.08	10.09	24.09	11.10	21.10	-2.2^{0}C	15.10

Date of emmigration flight

Date of back-migration flight
Year 2003 virginogenes of IXth generation 22.09

NOTE:
F = Fundatrix
Fg = Fundatrigene
V = Virginogene aptere
Vs = Virginogene sexupare
S = Sexuate ♂ aripaţi
♀ aptere
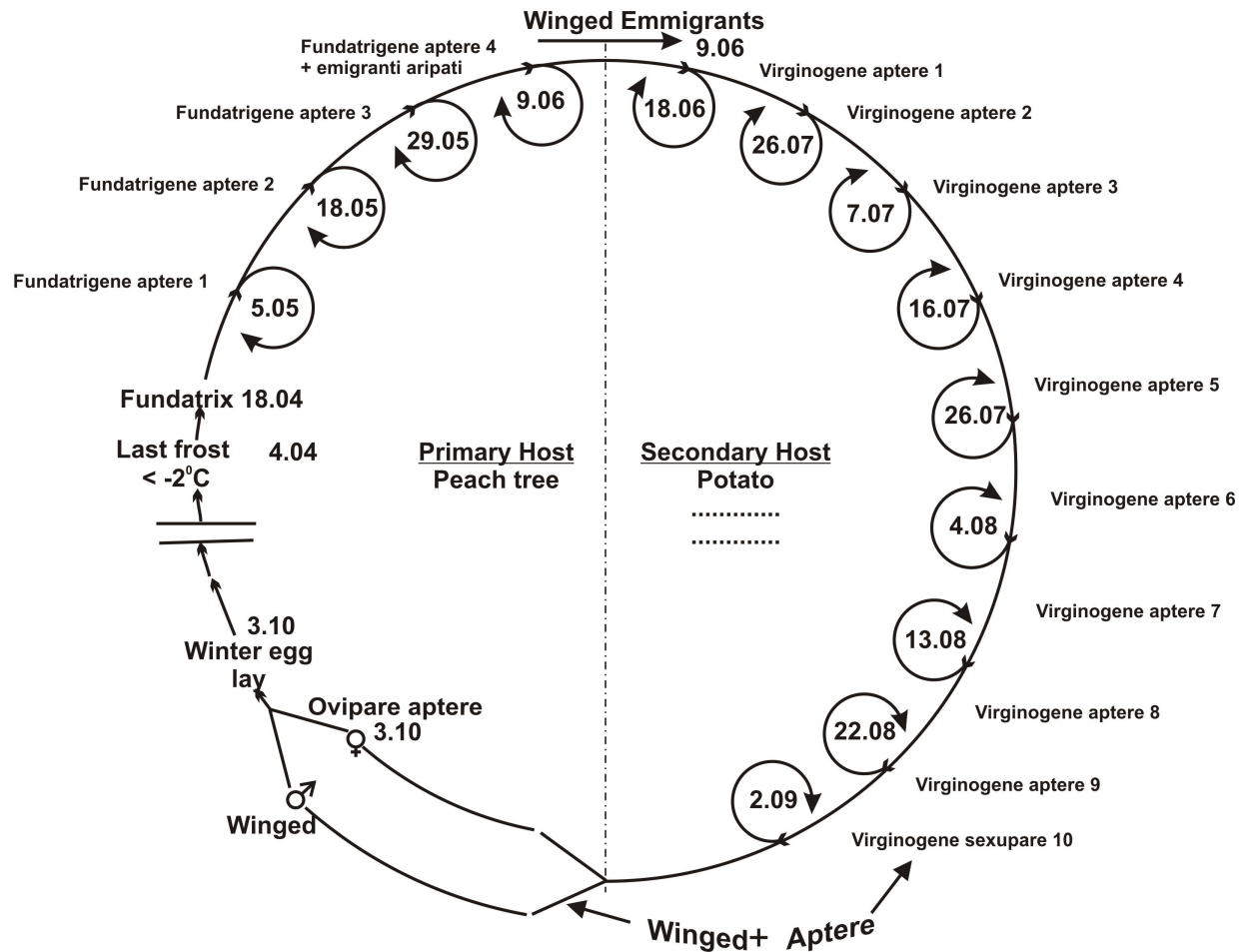
Fig. 2. **The peach tree green louse dioecic holoczcle – Myzodes persicae Sulzer, in the ecoclimatic conditions specific of Sibiu**

Conclusions

1.   In the Sibiu area the seed potato viruses vector aphids appear from the first days of potato springing keeping at high rate along June and July decreasing in August;

2.   In the Făgăraş region where Avrig is situated the abundance of viruses vector aphids is half compared to Sibiu region because of the colder climate due to cold air from the Făgăraş Mountains slopes;

3.   In the area of potato fields in Păltiniş, aphids appear carried at long distances by passive flight (wind transported) with a 40-45 days delay compared to Sibiu;

4.   The first and second decade of August is the time of viroses vector aphids in Păltiniş. This means 10-20 days before potato stalk destruction thus the migration of viruses to the tubers is stopped;

5.   In these conditions producing potato seed in the high regions of Păltiniş ensures virus free seeding material that is propagated in the cold submountain region thus ensuring the needed seed for Sibiu county avoiding long and expensive transportation from the closed areas of seed potato production;

6.   Important is also the variety cultivated due to sensitivity to viruses or due to anatomic characteristics that may favor or stop persistent viros inoculation;

7.   Through coordinates of growth, development and propagation a prognoses of the holocycles of different species is possible, the aphides being insects most suitable to mathematical modeling;

8.   The virus infection percentage after the first and second propagation year for the potato planting material from Păltiniş is considerably determined by the evolution of the aphid population (the main potato viruses vector – Myzus persicae), by the dimension of the infection

source from outside the crop and is less determined by the initial infection of the material;

9.   At present the seed potato production of the certified biological category is organized only in counties with closed areas. It is absolutely necessary that the other counties too direct their research towards organizing specialized areas (closed micro areas) in order to obtain seed potato of certified biological category Classes A and B in the mountain and highland region;

10. Obtaining biological category Class B outside the closed areas in Sibiu county is a solution to provide the need for seed potato for the whole area and provides also the premises to encrease production by generalizing the use of biological category Class B for planting food potato crops;

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SEED POTATO

RESERCH INTO PRODUCTION ELEMENTS FOR SEED

MATERIAL WITHIN THE MOUNTAIN-HILL AREA OF SIBIU

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Abstract

High altitudes, the existence of natural barriers create natural conditions for isolating crops and therefore reduce virotic desease propagation (BOZEŞAN, 2003). The potato represents for Romania a staple food for the population. The cultivation of potatoes all over the world has proved that with all the varieties by growing them year for year a depreciation of the vegetative system of the plant takes place. Implicitly, continuously and progressively the initial production potential degenerates. VELICAN (1959) in his attempt to elucidate the causes and prevention methods for the potato degeneration establishes three basic theories: ecological, physiological aging and virotical. To diminish the percentage of virus infected plants a better management of phytosanitary methods in producing seed potatoes is of necessity. Besides this also a higher proportion of resistant varieties within the admitted assortement is of importance. With the potato, more than with any other species, the planting material, characterized by its phytosanitarical, biological and physical features, is of paramount importance for constant, quality high rate yields (GOREA et all, 1982. MAN et all, 1984, BERINDEI, 1985).

Key words: potato, virosis, productivity, ecological

Aim and Object of conducted Research

Considering the importance of the potato crop in the Sibiu area and neighbour regions, as well as the producers tradition we have drawn our attention in research to solve aspects as:

– providing the complete need of seed potatoes from virus free areas;

– promoting for cultivation Romanian varieties;

– improving the zoning of potato varieties according to their resistance to climatic and virotic degeneration.

Object

Our study concerning the seed potato propagation in virus free areas of Păltiniş at 1420 m. has lead our attention to research the possibilities of constituting a closed microzone for the seed potato production and propagation in this area of the Cindrel mountains.

Considering the need to provide potato producers with virus free planting material we have oriented our research towards the following aspects:

– elaboration of a crop technology to meet the specific area conditions for the seed potato production and propagation;

– using the ELISA test to make to virus diagnoses of the obtained material;

– reducing the quantity of planting material from closed areas by obtaining the biological category class B outside the closed areas;

– providing the need of planting material, biological category class B for all producers in the highlands area, the Sibiu region and the neighbour areas;

– encreasing the average yield by generalizing biological category class B for food potato crops;

– encreasing crop profitability and consequently an encrease of benefits and profit for the seed potato and food potato producers of these areas.

Biological Material used for Research

According to the fact that a profitable crop needs the choice of an appropriate variety (BOZEŞAN, 2000) we chose:

– 9 new Romanian potato varieties: Robusta, Rozana, Runica, Timpuriu de Brasov, Amelia, Nicoleta, Productiv, Tentant, Dacia;

– 3 older potato varieties, imported and due to qualities still maintained in growing: Ostara, Sante, Desiree;

– as witness to comparing results, we decided for the average rate of the experience.

Research Method

The experiments conducted in order to analize the main factors in determining the phytosanitary and biological value for the planting material we applied completely the technology for cultivating the seed potato and we strictly observed the following technological links:

– the base was the biological category of the planting material for each variety;
– planting has been operated as early as possible;
– density of planting was 65000 plants/ha (70X22 cm);
– the size of the tubers used for planting was homogeneous (45-55mm).

Organisation of Research

In order to analize the possibility of obtaining outside the closed areas of potato planting material with correct phytosanitary and biological value, we organized an experiment in three locations as follows: the base biological category material produced at Braşov is propagated in the agricultural are of Avrig and Sibiu for a period of time of two years in order to obtain the biological categories class A and class B that will constitute the planting material for the farmers.

During the experiment we also observed:

1. The evolution of aphids in seed potato crops in the fields: Păltiniş, Avrig, Sibiu;

2. Researching the possibilities of seed potato propagation outside the closed areas.

Experiment Technique

1. The experiments concerning the evolution of aphid populations in seed potato crops in the fields had as aim to establish the favourability rate of the area for propagating the potato planting material. At the same time to establish the best moment to break off vegetation of the aphid affected potato in order to limit the attack of viroses from stalk and leaves to the tuber;

2. The experiments concerning the research of possibilities to propagate the seed potato outside the closed areas had as aim obtaining the biological category Class B in areas or specialized farms from the biological material produce dat Braşov and propagated one year at Păltiniş.

Experiment results and discussions

Results Concerning the Analyses of Production Material Elements Propagated in the Conditions of the Sibiu Highland – Mountain Area

Potato production amount is influenced by the phytosanitary and biological anality, that is by the degree of virotic infection of the planting material

Diagram of the Structure of the Obtained Production in the Experiment Field of Păltiniş

The structure of the obtained production in the experimental field of Păltiniş for the year 2001 shows that all the experiment varieties including all species behaved well in the potato planting material propagating process (fig. 14). Analysing the results (fig. 15) for later species in the three years of experiment it is evident that production is determined by the amount of seed tubers followed by tubers with a diametre bigger than 55 mm and is less determined by the tubers below standard.

Diagram of the Percentage of Seed Obtained in the Experiment Field of Păltiniş

The percentage of seed obtained in the year 2001 (fig. 16) doesn't show significant differences in the species comprising 57,4% (Ostara) and

64,6% (Timpuriu de Brasov). In 2002 the percentage of obtained seed kept at a favourable level between 56,6% (Runica) and 70% (Dacia). The same is true for 2003 with the exception of Tentant with a percentage of seed less than 50%.

The obtained results concerning the percentage of seed with later species show the same capacitz in the context of a specific technology to form an important percentage of seed tubers (fig. 17.).

Results Obtained in Analyzing Productivity Elements of the Păltiniş Material Propagated in Sibiu and Avrig in 2002

The analyses of results of the two places has been done by comparison of the productivity elements, of total yield, of total number of tubers, of fractions and of percentage of seed:

Diagram of the Yield Structure in the Experiment Field in Sibiu and Avrig

Yield structure in the fields Sibiu and Avrig in 2002 and 2003 shows a similar good behaviour of all the experimented species in the propagation process of the potato planting material (fig. 18).
Results analyses walk the same pass described earlier with special evidence for high productivity rates for the Sante, Nicoleta, Amelia species (fig. 19).

Diagram of the Percentage of Seed in the Field of Sibiu and Avrig

For the early species in 2002 in Sibiu the percentage of seed is over 55% excepting Ostara (fig. 20).
Significant differences between species have been registered for the later species in 2002 in Sibiu (fig. 21).

Results of Productivity Analyses of the Păltiniş Material Propagated in Sibiu and Avrig in 2003

The analyses of results in the two places in 2003 has been done by comparison of productivity elements of Sibiu and Avrig.

Diagram of Yield Structure in the Experiment Fields Sibiu and Avrig

The results of 2003 concerning the Păltiniş material show for Sibiu a yield structure that is mostly determined by the seed tubers with significant differences between the analysed species (fig. 22).
The results for later species follow the earlier presented trend. The Sante, Nicoleta, Robinta, Productiv, Amelia species can be named for their high productivity rates (fig. 23).

Diagram for Seed Percentage in the Experiment Fields in Sibiu and Avrig

The seed percentage for early species in 2003 in Sibiu show rates over 55% excepting Ostara (fig. 24).

As for later species in 2003 in Sibiu there are significant differences between species (fig. 25).

Pӑltiniş, 2001

	Ostara	Timpuriu de	Runica
< 30	1,6	4,6	1,9
> 55	4,6	2,2	5
30 - 55	8,3	11,8	9,4

Pӑltiniş, 2002

	Ostara	Timpuriu de	Runica	Robusta	Tentant	Dacia
<30	1,8	5	1,4	2,3	1,7	2,1
>55	6,1	1,7	4,9	9,8	4,8	3,2
30 - 55	12,2	12,5	8,4	17,7	10,2	12,2

Pӑltiniş, 2003

	Ostara	Timpuriu de Braşov	Runica	Robusta	Tentant	Dacia
< 30	1,5	4,5	2,4	2,9	1,6	2
> 55	11,8	3,5	12,1	13,3	18,6	14,1
30 - 55	20,5	24,6	22,3	38,8	18,1	39,2

Pӑltiniş, 2001

	Desiree	Sante	Nicolet	Amelia
< 30	1,7	1,5	1,5	1,2
> 55	5	6,4	5	4,3
30 - 55	10	15,1	9,4	10

Pӑltiniş, 2002

	Desiree	Sante	Nicoleta	Amelia	Rozana	Productiv
<30	1,5	1,6	2,7	1,6	1,8	2
>55	1,8	7,3	5,5	2,7	4,5	2,3
30 - 55	9,4	16	10,9	11	15,3	13,6

Pӑltiniş, 2003

	Desiree	Sante	Nicoleta	Amelia	Rozana	Productiv
<30	2	1,7	2	1,5	2,1	1,8
>55	11,1	8,3	11,1	8,6	8,6	11,3
30 - 55	22,7	23,9	24,7	26	22,6	36,1

Fig. 14. **Structure of production obtained with early species in Pӑltiniş 2001- 2003**

Fig. 15. **Structure of production obtained with later species in Pӑltiniş**
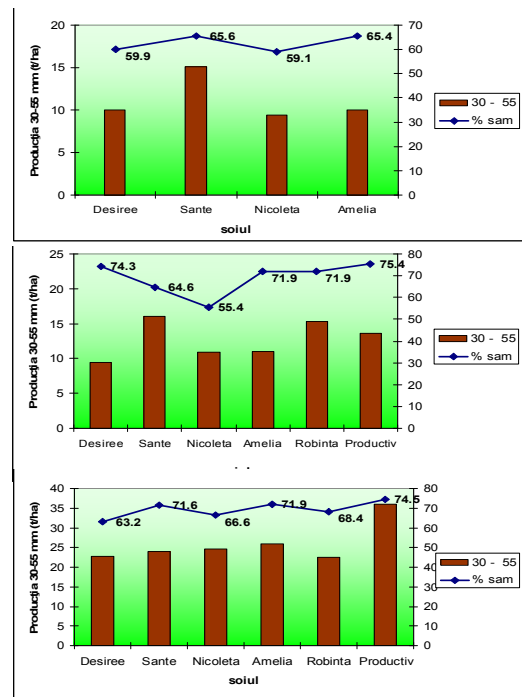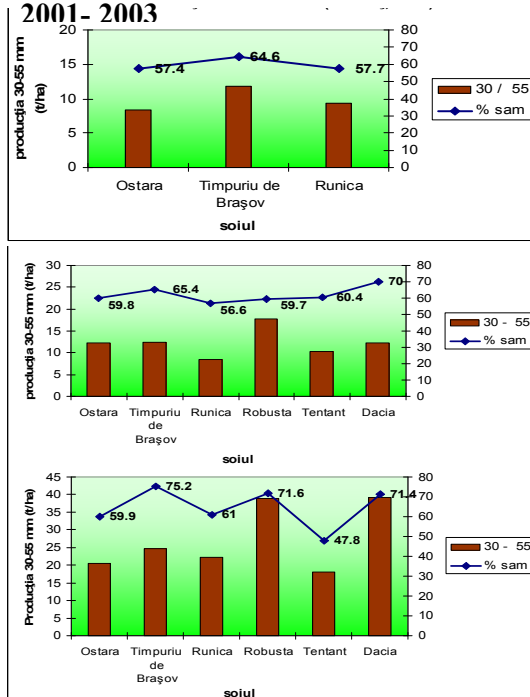
Fig. 16. **Percentage of seed obtained with early species in Pӑltiniş 2001-**

Fig. 17. **Percentage of seed obtained with later species in Pӑltiniş 2001-**
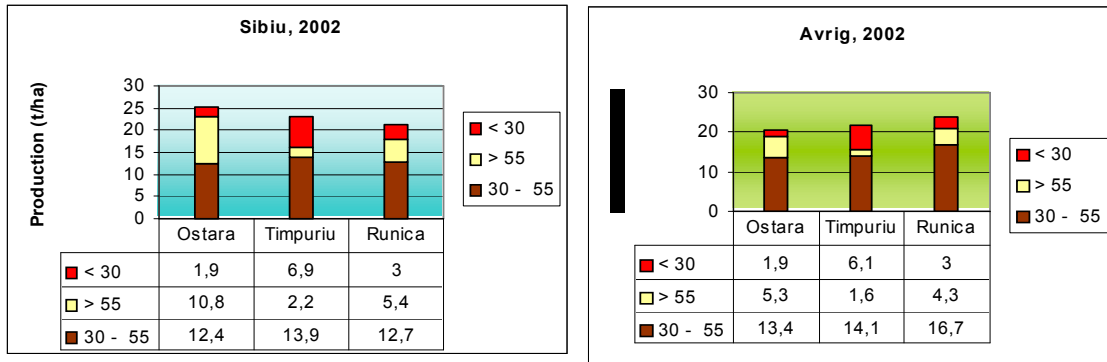
Fig. 18. The yield structure for early in Sibiu and
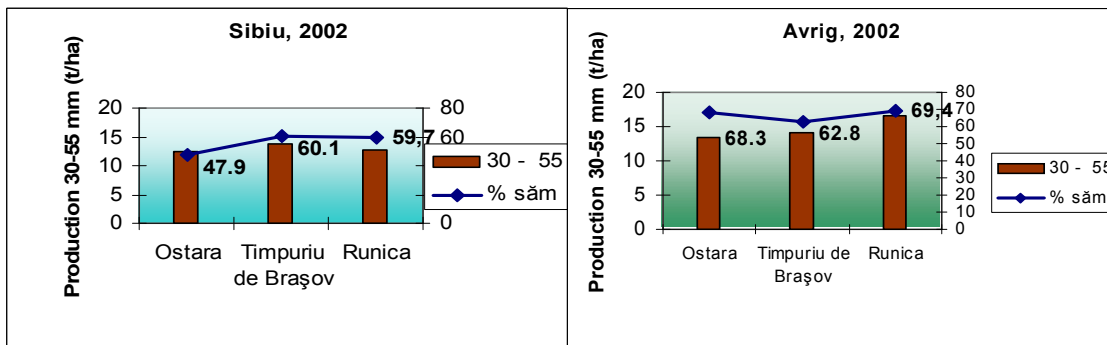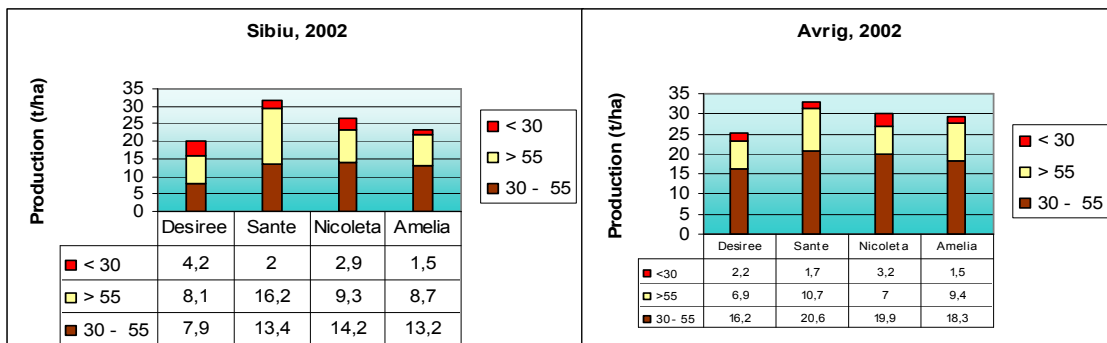
Fig. 20. Percentage of seed for the early species in Sibiu and Avrig in 2002
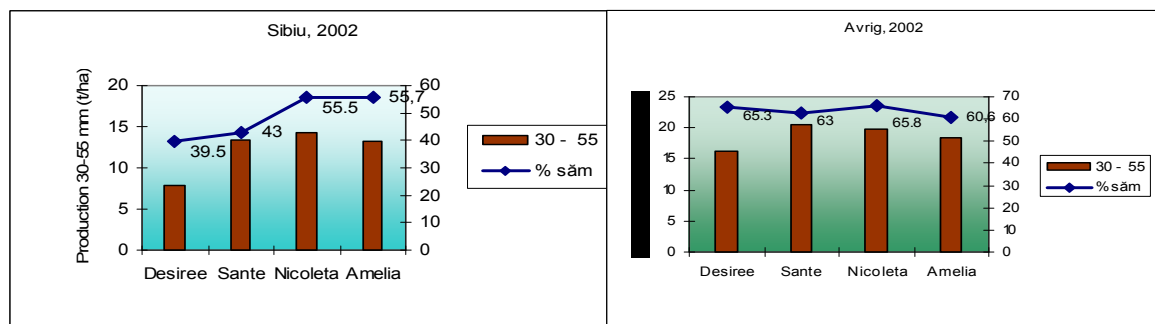
Fig. 21. Percentage of seed for the later species in Sibiu and Avrig in 2002

Conclusions

Lately, the necessity arose for creating specialized species according to use groups. Thus the need to select species with a great number of tubers, Timpuriu de Brasov and Nicoleta; species that are industrialized and require equalshaped tubers, but also species with big size tubers very asked on the market (Amelia, Robusta);

According to productivity result analysis for all the varieties experimented at Păltiniş, Sibiu and Avrig the conclusion is positive with special mention of Robusta, Dacia, Ostara and Tentant for early species and Sante, Productiv, Robinta, Amelia, Nicoleta for later species;

The Romanian potato varieties have a high biological production capacity given by the existing equilibrium between the number of tubers and their size, characteristics usually in a negative balance (small tubers and many or the reverse);

Refering to seed percentage from the three experiment fields we mention positively Timpuriu de Brasov, Dacia, Robusta and Ostara for early species and Sante, Amelia and Productiv for later species;

At Păltiniş – 1420 m in the virus free area could be organized the production and propagation of the biological category Class B seed potato on a 3 ha surface that could be encreased;

Biological category Class B can be produced in the low area o Sibiu county (Avrig – 420 m) in favorable climatic conditions, moisturized and chilly, on a 55 ha surface on fields with hightly favorable for potato growing;

Providing the need for seed potato on local basis for the whole potato cultivated surface in the county of Sibiu expensive would be reduced and important savings would be made each year.
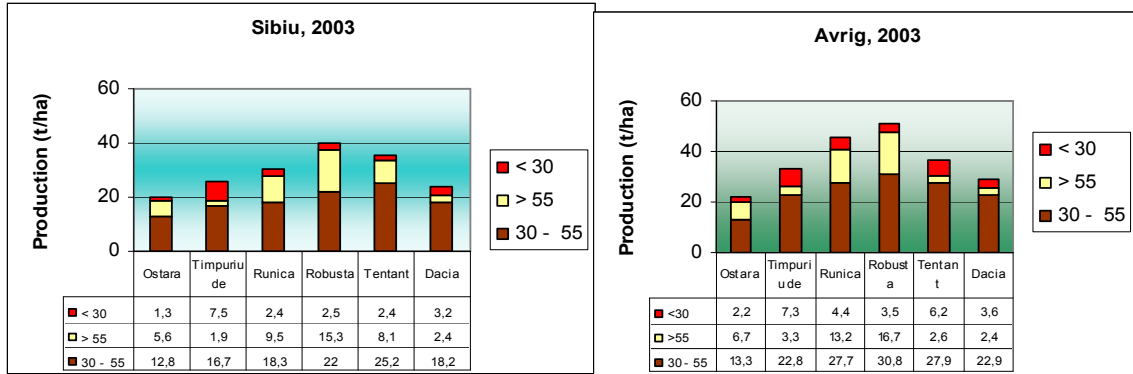
Fig. 22. Yield structure for early species in Sibiu and Avrig for 2003
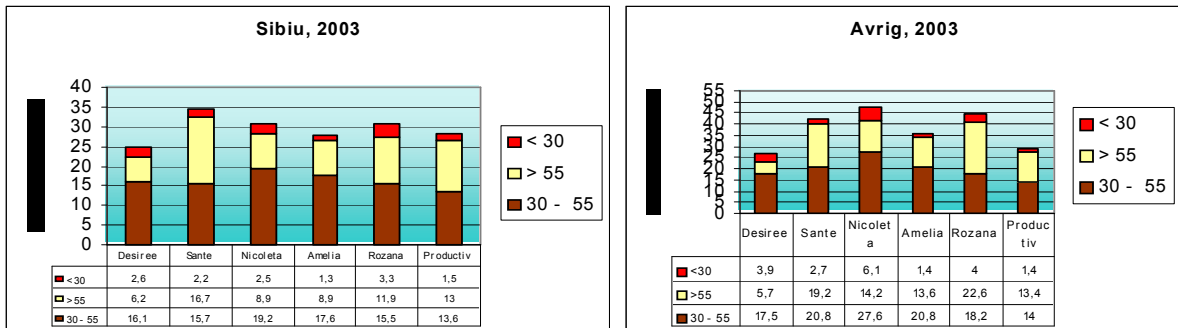
Fig. 23. Yield structure for later species in Sibiu and Avrig for 2003
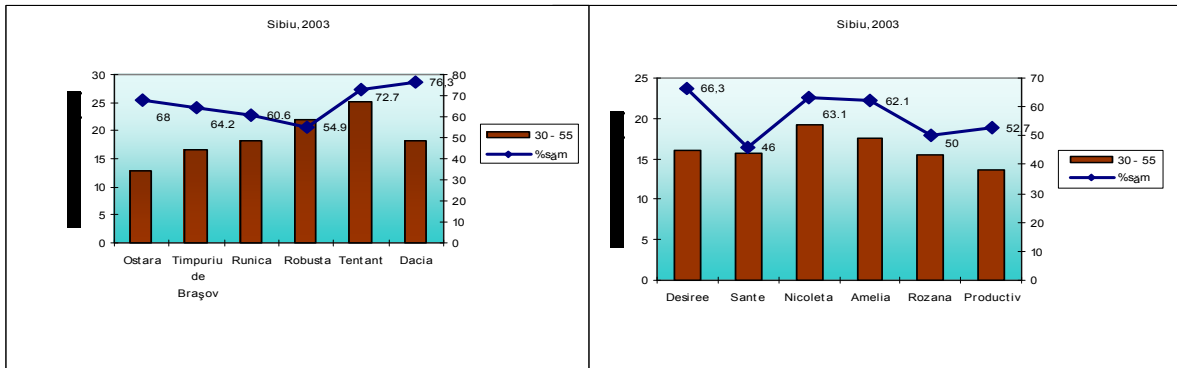
Fig. 24. Seed percentage for early species in Sibiu and Avrig 2003
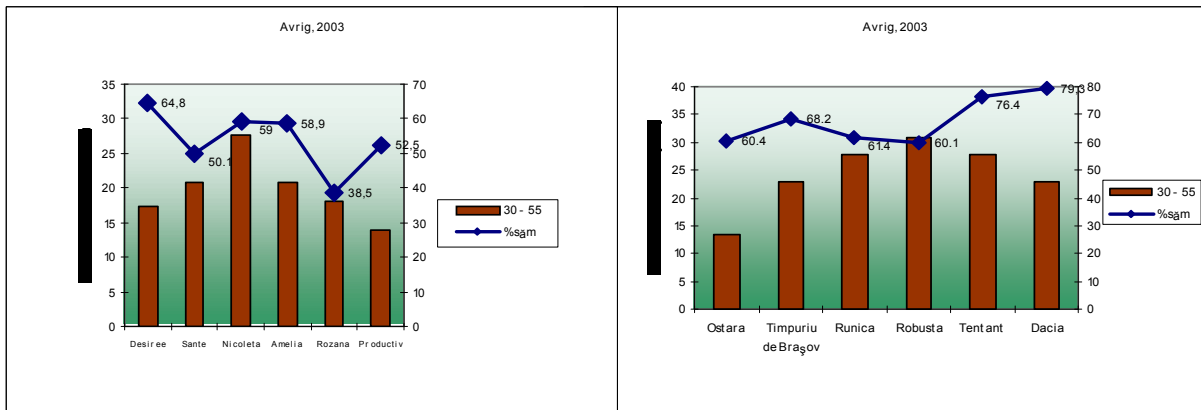
Fig. 25. Seed percentage for later species in Sibiu and Avrig 2003

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THE ANALYZE OF THE MAIN REPRODUCTION CHARACTERISTICS OF A FRIESIAN ROMANIEN CATTLE POPULATION

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ABSTRACT

The appreciation of the reproduction function of the cows from the analysed population shows the following values of the main reproduction particularities:

The medium age of the first birth is of 856.95 days (about 28 months) are proves a good reproductive precocity and a good milk production for the analysed population, thanks to an intense improvement, to the introduction of the calves for reproduction at the optimus moment (18-19 months) and also thanks to the correct use of technology in growing the young population.

The cows from Mogoşoaia farm have a good rithmicity in the reproduction activity, the calving-interval is of 412.17 days (about 13.4 months), with small variations in lactations, a result which is close to the one characteristic for Friesian Romanian Breed.

In the analysed population the medium duration of the service-period was of 131.89 days, bigger with 42 days that the ideal one (90 days) which inssures a maximus reproduction capacity of the cows. The service-period has low variations from a lactation to the other (128 days from lactation IV-V; 133.8 days in lactation III).

The medium udder rest is of 52 days and it is sittuated under the optimus duration (60 days) recomanded to milk cows, regarding the age, the udder rest is longer for primiparous cows (52.1 days) and especially for the cows during the IV th lactation (54.0 days).

KEYWORDS: Friesian Romanian cattle, age of the first birth, calving-interval, service-periode, udder reste.

INTRODUCTION:

The breeding activity of the cattle is a complex process, very important, that includes zootechnic, veterinary and organized actions, meant to inssure the perpetuation of the species and to obtain a larger member of products from each animal used in the breeding process. So, the expression that reproduction is the „foundation" for the breeding of cattle is correct, because reproduction influences in a determinated way the increase of the populations, the genetic improvement activity, the production level, the health and the

economic efficiency of animal breeding.

In comparison with other species (pigs, sheeps, birds, goats) the cattle have a series of characteristics which are disadvantageous for the reproduction process such as: they are belated (the sexual maturity cames later; the first parturition is obtain at the age of 27-36 months – Dumitrescu et al, 1982; Bogdan et al., 1981; Liciu, 2000), the prolifications is low (the cows give birth to a single product per year), the generations interval is long (aproximatly 5 years - Drăgănescu, 1979; Drăgănescu and Grosu, 2003), and reproductive longevity is low.

Taking into consideration the particularities, a special atention must be given to the sensible organization of the reproduction process (the fast track down of the buller cows, their proper insemination, giving them assistance on birth, solving the posible postpartum complications etc.) so that every cow may produce annualy a calf. Also, it is very important the nourishing and the rational care of the pregnant cows, of the reproductive bulls and the rational breeding of the calves, so that mortality deathes can be as small as posible.

MATERIAL AND METHODS:

The appreciation of the reproductive function can be realised directly through the signs, throught general medical examination or genital aparatus examination and indirectly by calculating the reproduction indexes. From the numerous factors which inffluence and condition the results of the reproduction activity for cows, the following were analized: *the age of the cows when they gave birth for the first time, the calving-interval, the service-period* and *the udder rest*. This indexes were established in a Friesian Romanian cattle population raised in Mogoşoaia Unit and by variance analyze there were calculated the main statistic indices: average ($\overline{X}$), average error ($S_{\overline{X}}$), standard deviation (S), and variability coefficient (CV).

RESULTS AND DISCUSSION:

The age of the first birth - this index express the precocity of reproduction and the milk production precocity [Georgescu, 1998]. High precocity has a double semnification: on one side a biological semnification because it shows a high degree of breed perfecting, and on the other side an economical one, because it reduces the unproductive and so, it diminishes the costs per product, insuring proffit. The age of the first birth influences the milk production, specially the first lactation and even the following ones, and in normal feeding and nourishing conditions, the age of the first birth is positivly corelated with the bodily development. Also, this index influences the number of obtained calves and the productive longevity of the cows. Although, economicaly, the first parturition must be at an younger age, in order to reduce the breeding costs in the productive period, this tendency must

not be exagerated, because during the first 2-3 lactations a small quantity of milk and dystocia frequency grows.

It is not recomanded the delay of admiting female calves for reproduction over the optimus term (where they have 70-75% of the weight of an adult cow), because thanks to the acumulation of adipose tissue into the udder lowers the production of milk on the first lactation, it grows sterility among calves because of the ovary degeneration and so less calves are obtained.

In the analized population, the medium age for the first parturition was of 856.95 days (about 28 months) with a middle variability (CV=13%) (table 1). This value proves a special reproduction precocity and a milk production precocity for the analized cows, results which put the cows from Mogoşoaia farm at the superior poll of Friesian Romanian Breed from the precocity point of view (by the breed's standard the first pregnancy should appear at a 30 month age - Acatincăi, 2004; Georgescu, 1990, 1988, 2000).

Table 1

The medium values of reproduction indexes for the analysed cows population

Index	n	$\overline{X} \pm S_{\overline{X}}$	S	CV$_\%$
Age of the first birth	**804**	**856.95±3.86**	**111.017**	**12.95**
Calving-interval	**1956**	**412.17±2.04**	**82.56**	**20.03**
Service-periode	**1956**	**131.89±2.03**	**82.59**	**62.62**
Udder rest	**1956**	**52.14±0.55**	**24.36**	**46.71**

The first parturition at the age of 27-28 months is considered optimum for the Friesian Romanian Breed, and it proves a high degree of improvement of the analysed population, an optimus integration of calves for reproduction (18-19 months) when they realized 70-75% of bodily weight of adult animals and also a good use of technology in breeding the young population.

But, in comparison with the Holstein-Friza breed, the precocity of the Friesian Romanian is inferior, the first parturition takeing place at the age of 28 months and not of 24-27 months [Georgescu, 1990, 2000; Miriţă et al., 1983]. Takeing into consideration this difference, the process of improvement of the Friesian Romanian Breed must continue through selection, by artificial insemination with the seminal material from the most valuable bulls tested on progeny and by infusion cross breeding with Holstein-Friza bulls. A special attention must be given to the feeding and nourishing of the young population of animals.

The results obtained in this study, are superior to those **comunicated by other authors. For example, Alexoiu (1983), establishes for the active population of Friesian**

Romanian Breed the age for the first birth at 30 months and 15 days, a results with almost 2 months inferior to the one obtained for the Mogoşoaia cows farm. The same result (aproximately 30 months) was comunicated by Georgescu et al. (1988) on a representative population of 273465 cows. Culea et al. (1999) establish that the Friesian Romanian Breed have their first parturition at the age of 27.5 months.

The calving-interval - represents one of the most important index which offers important pieces of information about the reproduction activity in cows farms. The calving-interval influences the milk production per lactation during the productive life of the animals but also the number of obtained calves.

The calving - interval can be established in two ways:

- the period of lactation + the period of udder rest;

- the period of service-period + the period of pregnancy (this is the formula used in this study).

Because the pregnancy period is relatively the same, it results that the calving-interval depends first on the other three factors.

The results presented in table 2 show that, in analysed population, the medium calving- interval was 412.17 days (aproximately 13.4 months).

In comparison with the age, the calving-interval varied a little from a lactation to the next, during the first six lactations the values were very closed (411-413 days), and during the last two lactations (the V th - the VI th) a slow lowerness of the calving-interval can be observed (407-408 days). This evolution is normal because with ageing, at the last two lactations the productivity level of the cows decreases and so does the lactation period, the mammary relaxation period and the service-period.

The analysed population is quite heterogenous regarding the calving-interval, the coeficient of variability being aproximately 20% (table 2).

Table 2

The variation of the reproductive indexes in relation with the age of the cows

Lactation	n	Calving-interval			Service-period			Udder rest		
		$\overline{X} \pm S_{\overline{X}}$	S	CV$_\%$	$\overline{X} \pm S_{\overline{X}}$	S	CV$_\%$	$\overline{X} \pm S_{\overline{X}}$	S	CV$_\%$
I	648	410.7±3.6	86. 1	20.9	131.5±3.5	84.7	64.3	52.1±0.5	24.3	46.7
a II-a	476	411.5±3.9	84.6	20.6	131.7±3.9	81.2	61.6	51.4±0.8	22.8	44.9
a III-a	352	411.8±4.0	82.0	19.9	133.8±5.0	84.0	62.8	52.0±1.4	26.9	51.6
a IV-a	219	413.4±5.2	88.1	21.3	128.0±5.7	77.3	60.0	54.0±1.6	23.8	44.1
a V-a	146	407.0±6.0	82.7	20.3	128.3±8.0	86.1	67.1	50.9±2.0	24.9	49.0
a VI-a	77	407.7±8.6	51.6	22.6	139.1±11.7	90.4	65.0	51.2±2.8	25.0	48.8

The results of the study are comparable with those comunicated by Alexoiu (1983) who establishes for the active population of the Friesian Romanian Breed, a medium calving-interval with variations between 377-420 days. By analysing the same active population (374742 cows), Georgescu (1988) indicates a calving-interval of 428 days. By analysing the calving-interval in a cows population, Culea et al. (1999) established the medium value for 402 days, with limits between 393-405 days.

From these results we can say that the cows from Mogoşoaia farm realise a calving-interval close to the one of the active Friesian Romanian Breed population, but bigger than the one characteristic to Holstein-Friza breed (under 400 days).

Usually, a calving-interval bigger than 406 days has negative influence on the efficient exploatation of milk cows, because it determins the obtaining of a lower quantity of milk, it lowers the number of lactation and the number of calves obtained during the active lives of the cows.

Because the calving-interval, such as other reproduction indexes, presents a low genetic determinism (h^2=0.08-0.10 – Georgescu et al., 1998; Popescu-Vifor, 1990; Drăgănescu, 1979; Drăgănescu and Grosu, 2003), in order to improve this index, the optimizature of breeding milk cows technology is neccesary, which includes a sensible organization of the rational exploatation of cows, because as it is well known, the enviroment factors influence the calving-interval in a proportion of 90%.

The service-period - this index together with the pregnancy-period, influence the reproductive capacity of the cows.

Georgescu (1983) shows that the farmer cannot act but in close limits during the pregnancy-period, and the way to improve the reproductive capacity of the cows is the service-period. The interval between parturition and positive insemination, does not influence the only reproductive capacity, but it influences the age structure of the herd, the reproduction frequency, the number of products and the milk production during the productive life.

The optimus period of pregnancy relaxation is of approximately three months tor the multiparous cows and four months for primiparous ones, which assure a 12 or 13 months calving-interval [Georgescu et al., 1990; Dumitrescu et al., 1982; Bogdan et al., 1981].

The extension of the service-period increase the milk production during that lactation because, on one side, it offer the possibility for the female cow to end her normal lactation (305 days), and on the other hand it lowers the depresive effect of pregnancy. The delay of insemination after parturition determs the increase of the calving-interval, which determins a lower number of calves and a lower production of milk during the entire active life of the female. In conclusion, it seems advantageous to reduce the service-period but takeing into consideration a series of factors, such as: age, productivity level and lactation period, uterin involution, the reproduction particularities for every cow, nourishing and health.

A service-period of 80 days allows us to obtain 9 products per female during productive life (one more in comparison with a 110 days of service-period), and a 12.5% bigger milk production.

The analysed population of cows presented a medium service-period of 131.89 day, with a very low variability (about 63%) (table 1). The big value of variability coeficient proves technico-organizing deficiency in the

reproduction process and probably some problems in assuring a optimus level of medium factors.

The interval between parturition and insemination of the cows is bigger with 42 days in comparison than the ideal interval, which inssures a maximus level of reproductive capacity for cows (132 days in comparison with 90 days). The result is inferior to the one communicated by Culea et al. (1999), which indicate a medium service-period for multiparous cows of 124 days.

But, the maximus capacity cannot be entirely realised at performant milk cows, an aspect met in Mogoşoaia farm. At this farm's level, a medium reproductive capacity of 88% was obtained in comparison with the ideal one of 100%.

The evolution of the service-period has small variations from a lactation to an other (128-133 days, except the VI th lactation) which suggest that age does not influence directly the duration of this index until a certain limit (table 2). So, old cows have a lower reproductive capacity, almost 86%.

The udder rest - represent a functional relaxation of the udder before parturition, during which the cow isn't milked.

The udder rest is a very important reproduction and exploatation index which influences the milk production during the current lactation and also dure the entire active life of the female. The udder rest is obligatory because of the following reasons:

- it inssures the normal development of the conception product because in the last period of pregnancy, the foetus has an intess rytm of development;

- it allows the udder to recover as well as the all body which is exhausted. In order to produce a litre of milk, 400 l of blood go through the udder so the glandular acinus and the mieopital cells are exhausted. During lactation, the body looses through milk 375 kg S.U., 105 kg fatness, 108 kg of protein, 21 kg of mineral salt [Georgescu et al., 1990];

- it assures the gathering of same reserves in the body, which will be used in the first 2 - 3 months of the mixt lactation when the nutritive balance is negative. It is considered that gathering of 50 kg of adipose tissue as body reserves assures the neccesary energy for the synthesis of 450-500 kg of milk [Acatincăi, 2004];

- it creates the possibility of a normal parturition.

In order to establish the correct duration of the mammary relaxation, in each farm must be kept a precisely evidence regarding: the data of the fertile insemination, the probabil date of parturition, the day when weaning begins and the day when it stops.

Generally, the udder rest has a 60 days duration, but it is neccesary to establish the duration for each cow, takeing into consideration: the age, the productive level, the duration of the previous lactation, the health and nourishling, the season of parturition. Generally, the primiparous cows will benefit from a longer udder rest also the cows with big milk production, the

female with a wick health and nourishing and those which give birth in winter (+5 days in comparison with the cows which give birth during summer).

In the analysed population of cows, it was established a medium duration of 52 days for udder rest with a very big variability (47%) (table 1).

The duration of the udder rest is not optimus if we take into consideration the high productive level of the analysed cows. But, a positive aspect met in the farm, is that all females benefit from a mammary relaxation closed to the normal one. For the high productive cows, this was aften insufficient for the body needs.

The duration of the udder rest regarding the age, proves the existance of a longer period of udder rest for primiparous cows (52 days) and for those that realised a maximus milk productivity during exploatation (52-54 days for the cows during the III th and the IV th lactation) (table 2).

CONCLUSIONS:

The appreciation of the reproduction function of the cows from the analysed population shows the following values of the main reproduction particularities:

1. The medium age of the first birth is of 856.95 days (about 28 months) are proves a good reproductive precocity and a good milk production for the analysed population, thanks to an intense improvement, to the introduction of the calves for reproduction at the optimus moment (18-19 months) and also thanks to the correct use of technology in growing the young population.

2. The cows from Mogoşoaia farm have a good rithmicity in the reproduction activity, the calving-interval is of 412.17 days (about 13.4 months), with small variations in lactations, a result which is close to the one characteristic for Friesian Romanian Breed.

3. In the analysed population the medium duration of the service-period was of 131. 89 days, bigger with 42 days that the ideal one (90 days) which inssures a maximus reproduction capacity of the cows. The service-period has low variations from a lactation to the other (128 days from lactation IV-V; 133.8 days in lactation III).

4. The medium udder rest is of 52 days and it is sittuated under the optimus duration (60 days) recomanded to milk cows, regarding the age, the udder rest is longer for primiparous cows (52.1 days) and especially for the cows during the IV th lactation (54.0 days).

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THE STUDY OF THE PRODUCTIVE CHARACTERISTICS OF A FRIESIAN ROMANIEN BREED

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ABSTRACT

The analysed effective had presented mean durating of the total lactation about 330 days, with a big relativity variability (almost 29%).

Per total lactation, it was a main quantity of milk of the 5822 kg (17.6 kg milk/day), and in succesion of lactations, the secretor level was continue encrease evolution from the first lactation (5295 kg) until third lactation (6248 kg), decrease slowly and it is maintained relativity constantly at the lactation IV-V th (almost 6000 kg), then decrease until the lactation VI th (5334 kg).

The analysed lot had maniffested a good precocity, with early helpness of the maximum production still from lactation III th (6248 kg) and of the big results of the milk quantity realised on the lactation I th on maximum quantity (84.7%).

The main precent of fatness per total lactation was the 3.88%, and in comparison with the lactation order, the minimum value (3.84%) was stablished at the lactation III th, and the maximum value (3.94%) at the lactation VI th.

The main quantity of fatness per total lactation was the 226 kg, and by the one lactation to another, pure fatness quantity it is an asscendent evolution until the lactation III th when are maximum (242 kg), then easely regress at the lactations IV-V th and at the VI th, decrease is ovius (208 kg).

KEYWORDS: lactation duration, milk quantity, fatness precent, fatness quantity, Friesian Romanian breed.

INTRODUCTION:

In the presents, the milk production has a main place in exploatating the cattle, an aspect shown by the numeric growth and by the doubling of milk production in this period [Georgescu, 1998]. The improvement of milk production of the cattle is a very complex process which reffers to the quantity of milk, the quality of milk, the lactation duration the milking speed etc.

MATERIAL AND METHODS:

The analyzed biologic material owed to Friesian Romanian breed, specialized for dairy production. Upon the data of the Official Yield Checking carried out in Mogoşoaia Unit there were established the average milk

quantity, the average fat quantity and percentage and the lenght (duration) of lactation. For each lactation (I-VI) and for the wole lactations there were calculated the main statistic indexes: average ($\overline{X}$), average error ($S_{\overline{X}}$), standard deviation (*S*), and variability coefficient (CV).

RESULTS AND DISCUSSION:

The lactation duration has a very big importance, because between this index and the quantity of milk exists a positive genetic correlation (r_G=0.45) [Popescu-Vifor, 1990]. So, a way of improving the milk production represents the extension of the period in which the cow can be milked.

As it is know, there are two posibilities of expressing the lactation duration: total and normal lactation.

The duration of the total lactation repressints the time frame parturition until weaning [Georgescu et al. 1998; Ujica et al., 1993, 1999]. The results regarding the duration of total lactation in report with the succesion of lactations and the medium duration per total lactation established for the analysed cow population are shown in table 1.

Table 1

The duration of total lactation considering the age of the cows
(succesion of lactations)

Lactation	n	$\overline{X} \pm S_{\overline{X}}$	S	CV%
I	824	324.50±3.44	98.97	30.49
a-II-a	577	336.93±3.49	83.90	24.90
a-III-a	414	330.17±4.32	88.02	26.65
a-IV-a	281	336.22±5.63	94.41	28.07
a-V-a	182	333.15±7.54	101.79	30.55
a-VI-a	114	318.93±10.57	110.87	35.39
Per total lactations	2392	329.98±1.90	96.33	29.19

The shortest total lactation duration is manifestes at the older cows during their VI th lactation and the primiparous cows (318.93-324.50 days) and the longest (almost 337 days) at the cows during their III th and IV th lactation. As a medium, the cows from the analysed population realise a lactation period of 330 days, with a relatively high variability (CV=29%).

The established values are framed between the limits specified in the speciality litterature. So, Georgescu (1988) establishes for the entire active population of Friesian Romanian Breed a lactation period of 336 days, a result which is bigger with 6 days than the one of the Mogoşoaia farm.

In a study made in Pantelimon farm, Marmandiu et al. (2002) have established for the Friesian Romanian Breed type Holstein Friza a medium total lactation period of 360 days (11.6 months) and per lactations the period

grew from 360 days during lactation I to the maximus level, 375 days during lactation VI and then it lowers during the next lactation (328 days at the VII th lactation). These values are superior to those established in Mogoşoaia farm, because Pantelimon farm as one of the most valuable population of Friesian Romanian Breed in Romania.

The milk quantity constituits the main objective of milk breeds improvement and it can be expressed per normal, total, the first 100 days lactation and per productive life quantity of milk.

In the improvement activity, the main criteria of milk production selection is the quantity of milk expressed as normal lactation, but the quantity of milk proper to the total lactation is taken into consideration.

The quantity of milk per total lactation shows the milk produced by the female from parturition until weaning.

Analysing the values from table 2, it results that the cows from Mogoşoaia farm realysed a medium milk production per total lactation of 5822 kg. In succesion of lactations secretor level has been in ascension continue from the lactation I (5295 kg) until lactation III th (6248 kg), easly decreases and it maintain constant relativity at the lactations IV-V th (almoust 6000 kg), then increase at the lactation VI th (5334 kg).

The cows from Mogoşoaia farm realysed a daily quantity of milk of 17.6 kg, close to the one characteristic for the specialised in milk production breeds.

The population is quite heterogenous regarding the quantity of milk per total lactation, the medium value of the variability coefficient being approximately 30% with same variations regarding the order of lactation (25% for the third lactation until 34% for I and VI th lactation) (table 2).

The middle of the bigg value variability coefficient suggest that ones plusvariants which could be selected on the "selection nuclees", nominalisated at bulls mother and an intens activity on the reproduction and improvement milk cows. These females might be chosen as embryo donors, polyovulated, inseminated with the genetic „top" bulls of the breed and the embryos transferred to the receptor cows. By this way the prolificacy of cows with remarkable breeding values is improving, so it might be applyied a higher selection intensity the increasing of the genetic progress and accelerate the cattle breeding rhythm. Meanwhile the special value cows and bulls progeny will have high milk productive abilities [Marmandiu, 2004].

On the milk quantity realised on the total lactation, the analysed lot had a good *precocity* sustineid by the early maximus production, from lactation III th and by the big quantity of milk realysed on the lactation I from the maximus quantity (84.7%).

Graphyc representation of the milk quantity from one lactation another, releaves that a typical particularity of milk cows that is *lactation curve*, an ideal aspect: stage of the short ascension, stage of the long plateau and stage

slow unascension.

Into one study made in Pantelimon farm, at the Holstein Friza cows (837 lactations), Marmandiu et al. (2002), it results a middle quantity of milk of 7830 kg, with 3.86% fat and 301 kg pure fat per normall lactation and 9366 kg of milk, 3.86% fat and 361 kg pure fat per total lactation (mean durating of the total lactation was of 383 days).

TABLE 2

The values of milk quantity considering the age of the cows
(succesion of lactations)

Lactation	n	$\overline{X} \pm S_{\overline{X}}$	S	CV%
I	824	5294.6±62.9	1806.4	34.1
a II-a	577	5973.9±62.5	1502.0	25.1
a III-a	414	6248.1±82.5	1680.5	26.8
a IV-a	281	6091.5±102.9	1725.3	28.3
a V-a	182	5990.4±131.4	1773.5	26.91
a VI-a	114	5334.2±170.0	1816.1	34.05
Per total lactations	2392	5822.12±102.03	1717.3	29.50

An important objective in cows breeding is the *quality of milk.* *The fatness percent* varied between close limits (3.84-3.94%), the highest limits were during the last two lactations (table 3). Fatness growes precent at the end of the productivity life is natural because the lactations V th and most VI th, correspond to the increase secretor level, and between the quality and quantity exists a negative correlation (r_G=0.20-0.57) [Vifor, 1990; Marmandiu et al., 2001].

Per total lactations the analysed lot had realised a main fatness percent of 3.88%, identical almost with the precent of the normal lactation (3.89%) (table 3). The value of the variability coefficient had situeted under 10%, which means the homogenity of the analysed lot.

Table 3

The evolution of fatness precent considering the age of the cows
(succesion of lactations)

Lactation	n	$\overline{X} \pm S_{\overline{X}}$	S	CV%
I	824	3.86±0.01	0.23	6.09
a II-a	577	3.84±0.01	0.25	6.58
a III-a	414	3.88±0.01	0.22	7.18
a IV-a	281	3.88±0.01	0.28	7.32
a V-a	182	3.94±0.02	0.34	8.69
a VI-a	114	3.90±0.03	0.42	10.76
Per total lactations	2392	3.88±0.02	0.29	7.77

The results of study on *fatness quantity* presents in table 4, shows that per total lactations, the cows from Mogoşoaia farm had realised the main of the 226 kg of pure fatness with a big variability coefficient (30%).

The evolution analyse of the fatness quantity looks like an encrease dynamicity until of lactations III (242 kg), and decrease at the lactation IV-V th, and VI th (208 kg). The heterogenity of the lot it is maintain on one lactation to another (variability coefficient it is 26-37%).

Table 4

The variation of fatness quantity considering the age of the cows

(succesion of lactations)

Lactation	n	$\overline{X} \pm S_{\overline{X}}$	S	CV%
I	824	204.37±1.42	69.35	34.40
a II-a	577	229.40±2.43	58.54	26.56
a III-a	414	242.43±3.18	64.90	27.86
a IV-a	281	236.35±3.91	65.67	28.97
a V-a	182	236.02±5.43	73.27	31.02
a VI-a	114	208.04±7.19	76.83	36.84
Per total lactations	2392	226.10±3.93	68.06	30.10

CONCLUSIONS:

1. The results of study shows that population cows from Mogoşoaia farm was more improvement to the quantity good care, but also the milk quality. So, thanks to the selection, was keeped for the reproduction, just superior cows.

2. The analysed effective had presented mean durating of the total lactation about 330 days, with a big relativity variability (almost 29%).

3. Per total lactation, it was a main quantity of milk of the 5822 kg (17.6 kg milk/day), and in succesion of lactations (the curves of the lactation), the secretor level was continue encrease evolution from the first lactation (5295 kg) until third lactation (6248 kg), decrease slowly and it is maintained relativity constantly at the lactation IV-V th (almost 6000 kg), then decrease until the lactation VI th (5334 kg).

4. The middle-big value of the variability coefficient (almost 30%) for the milk quantity character suggest that exists plus-mees which may be "selection nuclees", at bulls mother and a lot usedless to the reproduction and improvement of the Friesian Romanian Breed.

5. The analysed lot had maniffested a good precocity, with early helpness of the maximum production still from lactation III th (6248 kg) and of the big results of the milk quantity realised on the lactation I th on maximum quantity (84.7%).

6. The main precent of fatness per total lactation was the 3.88%, and in comparison with the lactation order, the minimum value (3.84%) was

stablished at the lactation III th, and the maximum value (3.94%) at the lactation VI th.

7. The main quantity of fatness per total lactation was the 226 kg, and by the one lactation to another, pure fatness quantity it is an asscendent evolution until the lactation III th when are maximum (242 kg), then easely regress at the lactations IV-V th and at the VI th, decrease is ovius (208 kg).

8. The analysed lot had prove a good homogenity about the fatness precent (variability coefficient under 8%), but it is heterogenity enough to be under the pure fatness quantity report (variability coefficient almost 30%).

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THE ANALYSES OF THE MAIN MORPHOLOGICAL CHARACTERISTICS OF A FRIESIAN ROMANIEN CATTLE POPULATION

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ABSTRACT
The results of the somatoscopic observations sustained by the values of the main bodily dimensions, prove that:

Morphologicaly, the cows from the analysed population have tipical characteristics for the morphoproductive milk type.

Regarding the bodily development, the analysed cows are situated in the category of eumetric cows, having a medium hight on withers of 131.15 cm and a bodily weight of 595.70 kg.

The increased values of the somato-productive index (1\10-1\11) are comparable with the characteristics of the cows specialized in milk production and prove that a bodily weight of aproximately 596 kg, satisfies the double desire of cows farmer for large productions of milk with a superior quality, in efficient economic conditions (low costs per litru).

The analysed population cows is included in the morphoproductive milk type, fact sustained also by the values of the main body indexes: 118.33% lateral body shape index; 100.47% the difference of height index; 2.04% the body frame index; 9.89% the dactylo-thoracs index; 15.39% the bone index; 3.39% the loaded leg index; 45.73% the substernal vacuum index. In comparison with the milk type, the analyzed cows have a bigger massivity (the massiveness index 155.59%, the compactness index 131.48%, the depht of the thoracs index 54.27%).

KEYWORDS: **body dimensions, body indexes, Friesian Romanian cattle.**

INTRODUCTION:

The researches made by many specialistes in the last few years, proved the existence of some positive closed relation between morphological characteristics of the cattle (especially body development), their productiv performance and the economic efficiency of growing this species.

Such as other animal species, the estimation of morphological characteristics plays an important role in the activity of genetics improvement for the cattle. The exterior also represents a big economic importance. So, it is proved that during the morphological characteristics influence the price of the cattle (calf, cows, bulls) in comparison with productive performances (the quantity of milk, of fatness etc.) realized by the ancestors of that animal.

Considering the role of the morphological characteristics in estimating the zootechnic and economic value of each animal, next we analysed the main morphological characteristics of Friesian Romanian population.

MATERIAL AND METHOD:

The aim of the study was the one of analyzing the main morphologic features of a Friesian Romanian cattle population. By observation and inspection it was appreciated the whole body type and upon the body measurements the were calculated the main body index.

For the assessed body sizes (measurements) in different age categories it was realized the simple variance analyze, predicting the main statistic indices: average ($\overline{X}$), average error ($S_{\overline{X}}$), standard deviation (S), and variability coefficient (CV).

RESULTS AND DISCUSSIONS:

The results of somatoscopic observations sustained by the values of the main *body dimensions* presented in table 1 proves that from the morphological point of view, the females from the analysed population, have typical *characteristics* for the morpho-productive type of milk:

- *the head* is fine, narrow, with almost right profile;
- *the neck* is long, thin, with numerouse falds on the lateral sides;
- *the trunk* is normaly wide and depth but long (the oblique lenght of the trunk = 150.93–155.20 cm, considering the age);
- *the region on the superior side of the trunck (withers, loins, the back, the croup)* are long, narrow (the widenes of the rump at hips = 50.29–59.42 cm);
- *the superior line of the trunck* is correct, almost horizontal, right, especially in the case of cows (between of hight on withers and the hight on the rump there is a difference of only 0.61 cm);
- *the thoracs* is long, sufficient wide and depth (the depth of the thoracs = 67.69–71.18 cm); the perimeter of the of the thoracs = 191.83–204.06 cm, favorabile for the good development of the interval organs with the vital function (the heart and the lungs), of who's development and normal functions depends the health of the animal and it's productive performance;
- *the abdomen* is bulky, it has the aspect of a "cash", at adult cows it allows the intake of a larger quantity of food which inssures a bigger quantity of milk;
- *the udder* is corectly complied, suited for the sistem of machine milking: it is big, it has the shape of a "square", with an obvious vascularisation, a reduced hairiness, well caught (former stretched, in the back it looks like a proeminence beside the buttock, and the nipples don't outrun the articulation of the shank); the udder has a good morphological simetry

which is structural and functional, the nipples are corect disposed on the udder body, aproximate parallel between them and perpendicular on the ground, sufficient distanced (these characteristics are for cows);

- *the legs* are tall, thin but with a resistant bones (the perimeter of the legs = 19.37–20.18 cm), they have correct leg soundness at most of the analysed animals;

- *the lateral, trapesium body shape*, thanks to a good development of the udder and of the abdomen;

- *the body musculature* it is poor developed;

- *the skin* is soft, elastic, it forms wrinkles on the head and on the neck, it is covered with short hair, fine, shiny, it is spotted with white and black.

Regarding the general particularities, the cow from the analysed population presents a *morphological dolicomorph type* (body shopes dominant narrow), *fine constitution*, *physiologic respiratory system*.

All body dimensions (the lengthes, widthes, the perimeters, the weight) presented an ascending continuous evolution related to the age of the animals, the maximus values accur in cows category.

Regarding the body development, the analysed population frames in the *eumetric cows category*, with a medium hight on withers of 131.15 cm and a medium body weight of 595.70 kg (table 1).

In comparison with the standard Friesian Romanian Breed (weight of 500-600 kg, medium hight on withers of 133 cm) [Georgescu Gh., 2000], the body weight of the analysed cows is closed to the upper level of the „standard" weight, but the size is a little bit inferior (−2 cm).

Althought the body development constitutes a secondary criteria in appreciating the breeding cows, due to the positive correlation between certain limits with the milk production (r_F=+0.27−+0.38) [Marmandiu et al., 2001] it must be included among the improvement objectives for milk cows. The positive correlation between body weight and milk production maintains itself until a certain limit, that once outruned, the milk production begins to diminish, because of the changing metabolism towards the anabolic type.

The optimus level of the body weight for each breed, is established taking into consideration the economic efficientcy with wich the milk production is realized. Once with the increase of the body weight, the consumption of nutritive substances grows in order to assure the vital functions so the milk surplus obtained from the cows with very big body weight can became uneconomic because of the increase of forage consumption [Georgescu et al., 1990; 1998].

The optimus body development which assures the maximus economic efficiency in exploitation of the milk cows, is established by calculating *the somatic-productivity index (the milk index)*. In the analyzed population, by reporting the medium body weight to the medium quantity of milk proper to

the entire population of cows, quantity established on the total and normal lactation, it rezults that the value of the milk index is 1\10 and 1\11 (at and alive weight of 100 kg, 1000-1100 kg of milk are obtained).

The values of this index can be compared with those characteristics for the specialized breeds in milk production (1\8-1\13 and 1\15 for high producing cows) [Georgescu, 1990].

These results suggest that, the increase of the body weight through selection and blood infusion with the more valuable bulls from Friza breed (in the genetic structure of the Friesian Romanian Breed there are ten bulls from the most valuable existing lines in the world, and 80% came from U.S.A.) [Georgescu, 1998, Murat, 1997], is good for milk production, but the optimus weight must be established with accuracy, which maintains a positive correlation between body weight and milk production.

It appears that, a body weight of approximatly 596 kg satisfies the double desire of cows breeders: a production of superior quantity and quality of milk but lower costs (big economic efficiency).

For the analyzed characteristics (with the exception of weight), the analysed population presented a low towards medium variety of body dimensions, the values of variability coefficient is situated below 10% in the case of the first age categories (calf with an age of 18 month and heifers) and between 12-14% in the case of adult cows. No matter the age, the body weight presented a medium variety (CV=11-17%) (table 1).

Table 1

The values of the main morphologic characteristics of the analysed population

Body dimensions	Age category					
	Females 18 months (n=150)		Heifers (n=150)		Cows (n=115)	
	$\overline{X} \pm S_{\overline{X}}$	$CV_{\%}$	$\overline{X} \pm S_{\overline{X}}$	$CV_{\%}$	$\overline{X} \pm S_{\overline{X}}$	$CV_{\%}$
Hight on withers (cm)	126.84±0.24	3.43	127.06±0.24	5.62	131.15±2.15	13.22
Hight on rump (cm)	129.01±0.27	3.79	129.50±0.15	2.49	131.76±2.16	13.21
Oblique lenght of trunck (cm)	150.93±0.44	5.34	153.58±0.29	5.66	155.20±2.45	13.17
Thoracs depth (cm)	67.69±0.21	5.60	69.31±0.12	4.86	71.18±2.26	13.22
Rump wide on hips (cm)	50.29±0.19	7.13	52.95±0.12	6.79	59.42±2.40	12.50
Thoracs perimeter (cm)	191.83±0.63	6.01	193.75±0.45	6.76	204.06±3.51	13.90
Leg perimeter (cm)	19.37±0.07	6.39	19.50±0.08	7.99	20.18±2.36	12.55
Body weight (kg)	420.75±4.17	14.23	480.51±2.08	11.26	595.70±12.96	17.55

The results prove a good homogeneity of the population, because of the proper conditions for growth assured from the period of young stock, but also thanks to the selective reform, straightened in the direction of eliminating the sick animals and those with a low productivity level. An animal selective

reform of 10-15% is recomanded, because is a many of improving the population, but it must be associated with the reduction of the necesity reform and the reduction of mortality. These factors affect considerably the size of the reproductive population and the posibility of increasing the total number of the cattle from the farm.

The results of the body measurement can be interpreted as absolute values, by direct comparison with the standard values characteristics of the Friesian Romanian Breed or as relative values by calculating the *body index*.

Because absolute values don't offer accurate signs regarding the general body conformation (body proportionality, the report of size between different body regions) it is necesary the characterization of the exterior of the animals towards *body indexes*.

Analysing the results from table 2, one may see the following:

- *the lateral body shape index* (the procentual report between the oblique lenght of trunck and the hight on withers) had values between 118.3-120.9%, values that correspond to the morphoproductive type of milk (118-120%) [Creţa et al., 1980] and to the standard of Friesian Romanian Breed [Georgescu 1990; 2000]. The result sustains the subjective somatoscopic estimation of the lateral trapesium body shape, characteristic for the analysed cows;

- *the massiveness index* offers indications on the massivity of the animals and represents the report between perimeter of the thoracs and the hight on withers. The results of the study indicates a bigger massivity for the analysed cows (151.2-155.6%) in comparison with the morphoproductive type of milk, and in comparison with the Friesian Romanian Breed standard (135-145%) [Georgescu 1998; 2000];

- *the difference of hight index* offers informations on the correctness of the superior line of the trunck, and also on the general development of adult animals. The values between 100.5-101.9% proves that the superior line of the trunck is correct, it has the tendency towards horizontallity, which express the solidity and the rezistance of the spine but also a proper general development;

- *compactness index* is the relation between the perimeter of the thoracs and the oblique lenght of trunck, it express the robustivity of the animals. The analised cows presented a value of the compactness index of 131.5%, a value with approximately 8-9% bigger than the medium characteristic of the Friesian Romanian Breed and of the morphoproductive milk type. This result proves a bigger robustivity for the analysed cows in comparison with the milk type and the Friesian Romanian Breed standard;

- *the body frame index*, represents the procentual relation between the semi-seem of hight (the hight on withers + the hight on rump) and oblique lenght of trunck. The analysed population presented a value of the bodily

frame equal (about 1.9 m^2 for calves with an age of 18 months and 2 m^2 for cows) with the characteristic of the Friesian Romanian Breed (1.9–2.0 m^2 - Georgescu, 1990; 2000);

- *the depth of the thoracs index* reflexes the development degree of the thoracs and is calculated by dividing the depth of the thoracs with the hight on withers. This index is influenced by the improvement level, the morphoproductive type, the age and the maintenance conditions of the animals. In the case of the analysed population, the value of the depth of the thoracs, especially for heifers and milk cows outruns the characteristoc value of the milk type (53.4-54.6% in comparison with 52-53%), and it is framed between the limits of the mixt morphoproductive type (53-54%). The result can be explaned takeing into consideration the fact that, unlike the breeds strictly specialised in the production of milk (mainly Holstein-Friza), initialy the Friesian Romanian Breed was exploited with a mixt purpose (for milk and for meat), and this is why the selection activity was orientated towards a good development of depth and width;

TABLE 2

The values of the main body indexes of the analysed population

Body indexes	U.M.	Age category		
		Females 18 months (n=150)	Heifers (n=150)	Cows (n=115)
teral body shape index	%	119.00	120.87	118.33
assiveness index	%	151.24	152.49	155.59
fference of hight index	%	101.71	101.92	100.47
ompactness index	%	127.10	126.16	131.48
dy frame index	m^2	1.93	1.97	2.04
pth of the thoracs index	%	53.37	54.55	54.27
ctylo-thoracs index	%	10.10	10.06	9.89
ne index	%	15.27	15.35	15.39
aded leg index	%	4.60	4.06	3.39
bsternal vacuum index	%	46.63	45.45	45.73

- *the dactilo-thoracs index* is established by the procentual relation of the perimeter of the legs at hight on withers and it is a very important index which shows the degree of bone development (the rezistence of the peripheric skeleton). With a medium value of 10%, one can say that the analysed population, no matter the age, have strong rezistent bones, capable to sustain the big body weight. The obtained values integrate between the limits of the morphoproductive type of milk and the Friesian Romanian Breed standard (9-10%) [Creţa et al., 1980];

- *the bone index* express the procent of the legs perimeter from the hight on withers of the animal, in order to appreciate the degree of bone development. This index is situated between the limits of the type and of the milk breeds (15% from 14-16%);

- *the loaded leg index* has the same semnification as the dactilo-toracs and the bone index and it was calculated by reporting the perimeter of the leg to the weight of each animal. In the analysed population, the values of this index vary between the limits of the milk morphoproductive type of Friesian Romanian Breed (3-6%) [Creţa et al., 1980];

- *the substernal vacuum index* is the difference between the hight on withers and the depht of the thoracs divided by the hight on withers, it indicated the development of the thoracs and of the hight anterior train. The calculated values indicate a good development for the depth of the thoracs.

CONCLUSIONS:

The results of the somatoscopic observations sustained by the values of the main bodily dimensions, prove that:

1. Morphologicaly, the cows from the analysed population have tipical characteristics for the morphoproductive milk type.

2. Regarding the bodily development, the analysed cows are situated in the category of eumetric cows, having a medium hight on withers of 131.15 cm and a bodily weight of 595.70 kg.

3. The increased values of the somato-productive index (1\10-1\11) are comparable with the characteristics of the cows specialized in milk production and prove that a bodily weight of aproximately 596 kg, satisfies the double desire of cows farmer for large productions of milk with a superior quality, in efficient economic conditions (low costs per litru).

4. The analysed population cows is included in the morphoproductive milk type, fact sustained also by the values of the main body indexes: 118.33% lateral body shape index; 100.47% the difference of height index; 2.04% the body frame index; 9.89% the dactylo-thoracs index; 15.39% the bone index; 3.39% the loaded leg index; 45.73% the substernal vacuum index. In comparison with the milk type, the analyzed cows have a bigger massivity (the massiveness index 155.59%, the compactness index 131.48%, the depht of the thoracs index 54.27%).

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ASPECTS REGARDING SEEDS QUALITY FROM LOCAL VARIETIES OF VEGETABLES, COLLECTED FROM DIFFERENT AREAS OF ROMANIA

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Abstract

Biodiversity conservation started to be considered as an environmental problem with the United Nations Environmental Conference at Rio de Janeiro (1992), where the Convention on Biodiversity was adopted. From then, several events which meant to emphasize the importance of biodiversity, took place. The preservation of agro – biodiversity is regulated by CEE Directive 98/95, The International Convention regarding Genetically Resources of Plants for Agriculture and Food (2001) and so on. In Romania, the problem regarding conservation and commercialization of vegetable seeds is alienated at the community legislation by Order nr. 1366/29.12.2005.

In 2007 at USAMV several actions for identification of small producers of vegetable seeds and collecting seeds from them took place. The goal of this activity was to point out local varieties with precious agro-biological characters and with resistance to biotical and abiotical stress factors. The most valuable local populations of vegetables will be recommended for organic agriculture and their seeds will be preserved at Suceava's Gene Bank and at a micro bank from USAMV Cluj-Napoca, which will be built this year.

There were 187 varieties of carrot, parsley and salad used in study and 23 homologated cultivars which for the seeds germination capacity was established, in case of salad biological purity being also determined.

The data obtained show that biological purity of salad was 100% only at 23.6% of the varieties while at 16.2% of these impurities surpass 25%.

The germination potential of the seeds reached the minimum level (65% for carrot and parsley, 75% for salad) at 38.5% of the local varieties and at 91.3% of homologated cultivars. Although the importance of traditional cultivars and local populations is obvious, a certain improvement of seed quality is mandatory on the free market.

Keywords: agro-biodiversity conservation, local varieties, vegetables, private producers, seeds, organic agriculture, legislation

INTRODUCTION

The reduced genetic variability of crop plants can, often, lead to the total or partial disparagement of the agricultural production, even to the loss of some species. One of the famous example in the past is that one of potato (*Solanum tuberosum*) from Ireland, from the Middle of the XIX century. The genetic resistance of the two-tree cultivated varieties was defeated by a very virulent physiological race of manna and thanks to it the potato production was totally destroyed. The consequences of this high genetic vulnerability aroused the death of 1.5 million Irish people and the migration of 2-3 millions in other countries. The same happened in USSR with the potato in 1922, with the citrus in Florida in 1984 and examples can go on [Primack and all, 2002].

The risk of crops' failure can be minimized by using of more cultivars and varieties of crop plants. The high level of uniformity means great vulnerability. Local varieties commonly hold unique resistance genes against diseases, pests, drought, and other biotic and abiotic stress factors. Once the green revolution started in the '60^s more and more farmers all over the world started to abandon traditional forms of agriculture, the old cultivars and local populations being also abandoned in favor of the modern varieties. The cultivation of these varieties allowed both increase of productivity and promotion of intensive and super intensive agricultural technologies. The industrialized agriculture meant however the loss of numerous traditional cultivars and also local varieties of crop plants. The superior harvests assured by the modern varieties are propitiously for farmers, for a short term, but the sustainability of agriculture depends on the genetic variability preservation, represented by the local varieties [Cleveland and all, 1994].

Organic agriculture development in the last years and consumers' greater demand for ecological products raised the interest of farmers in old cultivars and local populations because these ones respond the best to the low input agriculture systems [Chable, 2005; Micheloni, 2004; Lammerts van Bueren and all, 2002].

Numerous alarm signals, received from scientists, regarding the specific and intraspecific diversity reduction, led to a series of decisions made by international and European forums. The crossroad for biodiversity conservation was the *United Nations Conference for Environment and Development* from Rio de Janeiro (1992), where the *Convention on Biodiversity* was adopted [Cristea and Denaeyer, 2004].

For preservation of agro-biodiversity the most important document is the *CEE Directive 98/95*. The stipulations of this directive give the possibility of recording the local varieties of plants in the *Common Catalog*. The organic

farmers and the great associations and confederations of small farmers, from Western countries, (*Semences paysannes*, *Nature at Progres*, *Confederation paysanne*, *Les Semences de Kokopelli* and so on) consider that some stipulations of the directive are too restrictive and, therefore, they propose the adaptation or even the elimination of these stipulations. They consider that applying the DUS criteria (Distinction, Uniformity and Stability) on local varieties is incorrect, especially those regarding to uniformity and stability. They argue that the main destination of these varieties is organic agriculture, and the consumers of the ecological products are not as interested in standardization of quality as in case of mass productions [Zaharia and Kastler, 2003; Negri, 2005]. On behalf of this directive France made an annex of local varieties at the national catalog of varieties.

In 2001, *The International Treaty regarding Plants Genetic Resources for Alimentation and Agriculture* was signed. Recently, in 2005, The European Union adopted a directive that gives the possibility of separating the lists (homologates cultivars – local varieties), in order to protect all the vegetable resources in the most efficient way.

Romania still has a large variety of old cultivars and local varieties, mostly in the areas that hadn't been turned to cooperative before 1989 and in the isolated villages, with old population. These genetic resources risk to be lost forever, if they will not take appropriate measures to identify and conserve them [Maxim, 2007]. In Romania the only one institution that has constant preoccupations and that sustains the conservation of vegetal genetic resources is Suceava's Gene Bank, that has 13.961 samples, but the majority of them appertain at 11 crop plant species. Because the vegetable seeds are weakly represented in Suceava's Gene Bank, at the University of Agricultural Science and Veterinary Medicine (USAMV) from Cluj-Napoca a series of investigations regarding traditional vegetable seed producers from different counties of the country, especially from Transylvania, and actions for collecting vegetables seeds were initiated. After the primary and secondary characterization of these local varieties they will be preserved both at Suceava's Gene Bank and at USAMV, in a micro gene bank that will be built. The valuable varieties, which are good for the ecological crop system, will be popularized and recommended those that are interested [Maxim and all, 2007].

In this work there are presented some aspects regarding the quality of the seeds collected from peasants that produce vegetable seeds (carrot, parsley and salad) for local varieties.

MATERIALS AND METHODS

In the spring of 2007, USAMV Cluj-Napoca made an action to inventorize small producers of vegetable seeds from local varieties, from

different counties of the country, especially from Transilvania: Alba, Arad, Bihor, Bistriţa-Năsăud, Buzău, Cluj, Covasna, Dâmboviţa, Gorj, Harghita, Maramureş, Mureş, Sălaj, Satu-Mare and Suceava. Besides getting numerous information from small seed producers (identification data, tradition in seeds production, crop technology, the selection of the biological material, age, gender etc), in these expeditions were collected seeds from 187 local varieties and traditional cultivars of vegetables (carrot - 59, parsley -60, salad - 68). Parallel, homologated cultivars, which appertain to the same species, were studied (carrot - 5, parsley - 10, salad - 8). Before sowing them in the experimental field, for characterization and establishment of seed-production cultures, this seeds were analyzed in the laboratory. More exactly their germination capacity and the physical purity of the seeds were determined.

The germination capacity was determined by using of germination vessels with wet filter paper. A medium sample, made out from 100 seeds of each cultivar/ local variety, was taken in the consideration. The readings were made after 12 days at carrot, 14 days at parsley and 5 days at salad. The physical purity was determined only for salad, the color and the form of the seeds being taken into account. There were analyzed 300 seeds from each cultivar/local variety.

RESULTS AND DISCUSSIONS
The germination capacity of the seeds taken into study is presented in comparison, between local varieties and homologated cultivars. The biological purity couldn't be established in the same way, due to the fact that seeds of homologated cultivars were treated with pesticides and the natural color of the seed couldn't be observed in the laboratory.

Table 1

Data regarding the biological purity of the seeds for local varieties of salad (*Lactuca sativa*) proceeded from small seed producers from different areas of Romania, in 2007

Impurities proportion (%)	Number of local varieties		Observations
	number	%	
0	16	23.6	
1-5	12	17.6	
6-10	9	13.2	
11-15	12	17.6	
16-20	6	8.9	
21-25	2	2.9	
26-30	1	1.5	
31-35	1	1.5	
36-40	6	8.8	
41-45	0	0	
46-49	3	4.4	
TOTAL	68	100	

Data from table 1, show that the biological purity of salad seeds (*Lactuca sativa* L.), that came from small producers, can't be found at an adequate level, if we take into consideration the present legislation. Thus, from those 68 analyzed varieties only 16 had 100% purity, which represent 23.6%. The seeds proportion from other varieties situated between 1-5% in case of 12% of varieties. The biggest heterogeneity was registered at 4.4% of varieties.

Table 2

Germination capacity of the local variety seeds and homologated cultivars collected from private seed producers

Germinated seeds proportion (%)	Carrot (*Daucus carota* L.)		Parsley (*Petroselinum crispum* L.)		Salad (*Lactuca sativa* L.)	
	Number	%	Number	%	Number	%
Local varieties from small seed producers						
0	1	1.7	1	1.7	1	1.5
0-5	3	5.0	8	13.3	5	7.4
5-10	0	0	5	8.3	2	2.9
10-20	7	11.9	10	16.8	10	14.7
20-30	4	6.8	6	10.0	8	11.8
30-40	5	8.5	2	3.3	13	19.1
40-50	5	8.5	4	6.7	2	2.9
50-60	4	6.8	2	3.3	0	0
60-70	3	5.0	5	8.3	7	10.3
70-80	6	10.2	3	5.0	6	8.8
80-90	9	15.3	6	10.0	4	5.9
90-100	12	20.3	8	13.3	10	14.7
TOTAL	59	100	60	100	68	100
Homologated varieties						
0	0	0	0	0	0	0
0-5	0	0	0	0	0	0
5-10	0	0	0	0	0	0
10-20	0	0	0	0	0	0
20-30	0	0	1	10	0	0
30-40	0	0	0	0	1	12.5
40-50	0	0	0	0	0	0
50-60	0	0	0	0	0	0
60-70	0	0	1	10	0	0
70-80	0	0	2	20	0	0
80-90	2	40	2	20	2	25
90-100	3	60	4	40	5	62.5
TOTAL	5	100	10	100	8	100

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DATA ABOUT ENVIRONMENTAL FACTORS MONITORING, ON FEBRUARY 2008, IN SIBIU COUNTY

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INTRODUCTION:

Sibiu county situated in the South part of Transsylvanian, Northern of South Carpatians Mountains, between $45^o28'$ and $46^o17'$ Northern Latitude, and $23^o35'$ and $24^o57'$ Eastern Longitude in Transilvanian Plateau.

This is bordered an North and NE by Mureş county, at East by Brasov county at SE by Arges county, at South by Vâlcea county and West and South-West bz Alba county.

The Rainfall regimen varies depending on the unities of relief existent. This is the reason why the average yearly quantities oscillate between 650 mm in the depression zones and over 1300 mm on the montains tops (summits). Because of its relief and the geographical position, Sibiu county is divided into two hygrographycal basins:the Olt one (in proportion of 2/3) and the Mureş one 1/3 with an average density of 0,9 Km.

Although, in a general way the Vegetation belongy to the Central European one, there are also some elements specific only of this Province, the reason why a part of its Flora is protected by law. There are four vegetale level because the disposition of the relief in levels from 2500 m until under 400 m, corresponding gradual of the alpine grassland till the oak level.

The extension of the agricultural and pasture surfaces to the prejudice of the afforested ones, the excessive hunting, the development of transportations, and implicitly the intensification of the human circulation, are only a few peincipal elements that influenced negatively the natural evolution of Faune (especially the one of humting importance (interes), in the sense of dramatical diminuation of the species and animal number. In this context was very useful the adoption of a legislation meant to protect the national Flore and Faune a lot of species of plants and animals from the Sibiu county are under protection and are official declared Monuments of Nature.

Key words: monitoring, the air quality, the surface water quality, the pollution sources of the surface water.

MATERIAL AND METHOD:

On the basis of the statistical processing data after APM Sibiu resulted from systematic measurements and analysis of the environmental factors monitoring (the air, soil, vegetation) about the state of environment quality in Sibiu county, on can learn the following conclusions concerning the month February 2008.

THE AIR QUALITY

During the month of February, the average concentrations values of the observed pollutants were in frame of the admitted limits, exception being the suspension powders PM10, which exceeded 1.9 times the maximum daily values.

The general coefficient of air pollution in Sibiu County is of 0.1799. The assessment of the environmental air quality is based on the measurements resulted from the monitoring net of air quality in Sibiu County, implemented by APM Sibiu.

The prevelation points of monitoring net in Sibiu County is presented in the following table:

Table 1

The city	The station	The station type	Pollutant type	Number of tests	The average monthly concentration
Sibiu	Headquarter of APM	Urbane	SO2 NO2 PM10	21 21 21	0,7024 µg/mc 9,8871 µg/mc 56,450 µg/mc
			Sediment powder	1	1,4263 g/mp
			Pb from sediment powder	1	3,16 mg/mp
			Cd from sediment powder	1	0,15 mg/mp

THE SURFACE WATER QUALITY

In the month of February 2008 5 sections on the two water courses from B.H. Mures were studied. The evaluation of the surface water quality was based on processing of data obtained by own monitoring system.

The framing in quality classes for the analyzed sections was made based on of the chemical indicators identified, according to OM 161/2006.

During the sampling in February, the flow was higher than during the sampling in January.

The river Tarnava   is of IIIrd quality class in the upstream section Dumbraveni, the general class being given according to the oxygen indicators. For the upstream section Medias, the general class of quality is the IVth. This is due to the higher values of indicators like CBO5, CCOCr, CCOMn.

This situation is because of the snow melting and the organic substances transported in the riverbed (one can observe also the high levels of suspensions). Because of the tributary contribution and also the river's capacity for self-cleaning, for the upstream section Copsa Mica, the quality class becomes the IIIrd and it is given by a group of specific toxic pollutants of natural origin. The quality class becomes the IVth for the section Tarnava Mare, downstream Copsa Mica, and it is given also by a group of specific toxic pollutants of natural origin.

An additional contribution for the values has the economic factor S.C. Sometra S.A. Copsa Mica.

The river Visa has the III rd class of quality because of the used domestic and industrial waters pouring from the Ocna Sibiului resort.
The class is given by indicators of specific toxic pollutant group, of natural origin.

THE POLLUTION SOURCES OF THE SURFACE WATER

The analysis conducted by the Romanian Water National Administration Rm. Vâlcea, the Water Management System Sibiu and the Romanian National Water Administration – Mureş Water Management- the Waters Management System Mureş, concerning the effluents quality with negative impact on the county rivers, spotlighted the major pollutant sources for Sibiu County in February 2008.

THE VEGETATION QUALITY

During the month of February, the APM Sibiu Laboratory obtained data about 40 vegetal samples, based on processing the samples taken from different points: Răşinari, Copşa Mică, Târnăvioara, Micăsasa, Mohu, Mediaş and Sibiu.

The vegetal tissue analysis was made on vegetables: carrots (peel and core), onion (external and internal leaves), potato (peel and core) and also on corn and maize seeds (grains).

The identification of heavy metals (Pb, Zn, Cu) spotlighted their presence, but in small quantities, under the CMA limit. Cd was present only in the carrot samples taken in Copşa Mică.

THE SONOROUS POLLUTION SITUATION

During the month of February, the Environment Protection Agency Sibiu made 12 noise identifications in different points in the city of Sibiu, in order to identify the noise level caused by different artificial factors.

From data obtained in this month it was established that the CMA was exceeded in two monitoring points, with 16.67% according to STAS 10009/1988. These were registered on the segment: "Parks, entertaining and

rest areas, treatment resort areas"- in the Youth Park and the Municipal Hospital (for every point CMA was exceeded with 5.2 dB).

The maximum value recorded was of 77.1 dB (the Sibiu Airport), but it was not exceeded for the admitted limit for this category that is of 90 dB.

THE ENVIRONMENT RADIOACTIVITY

The measurements on environment radioactivity were made in the frame of R.A. Laboratory that belongs to the APM Sibiu (Environment Protection Agency) and they implied the taking and measurement of samples of aerosols, atmospheric depositions, crude waters, treated waters, soil and vegetation (during the period between April – October) on the whole county area, according to the methodology in force.

In the Sibiu area, the radioactivity values for all the factors mentioned above were established.

The considerations about the identified values at the "IMMEDIATE" measurements and "LATE" (after the disappearance of the natural radioactivity) are presented below:

1. AEROSOLS: THE FIRST INHALING

The average values are of 30.2% at the immediate measurements, comparative with "attention limit".
The maximum "immediate" value represents 59.56% from the corresponding "attention limit", which demonstrates that the radioisotopes were not artificial.

In this month there were "zero significant values" of the late measurements at the first inhalation. This proves that the residue did not store the artificial radioisotopes for a long time.

2. AEROSOLS: THE SECOND INHALING

The average values are of 16.2 at the immediate measurements, comparative with "attention limit".
The maximum "immediate" value represents 36.42% from the corresponding "attention limit", which proves that radioisotopes were not artificial.
This month there are 0 (zero) significant values of the "late" measurements at the second inhaling. This proves that the residue did not store at all the artificial radioisotopes for a long time.

3. THE ATMOSPHERIC DEPOSITIONS

The average values represent 0.4 % at the "immediate" measurements, respective 0.8 % at the "late" measurements, of the corresponding "attention limit".

The maximum "immediate" value represents 1.19 %, 1.06% at the "late" ones, of the corresponding "attention limit". We registered 21 significant values at the immediate measurements but the smaller values of the "late" measurements, where there are only 8 significant values with a maximum of 1.06 attention limit, proves that also this residue did not store artificial radioisotopes for a long time.

4. THE CRUDE WATER

The average value is of 0.18 Bg/l, and maximum value is of 0.26 Bg/l, which represents 9.0 - 13.0 % from the attention limit.
At the crude water the measurements are "immediate" and on refers to Cibin River, samples collected upstream Sibiu. There were 29 significant values registered.

5. THE TREATED WATER

The average value is of 0.14 Bg/l and the maximum value is of 0.19 Bg/l, which represents 7.2% - 9.5% from the corresponding attention limit. We specify that the average was calculated only of the significant values and these were 29 significant values at the treated water. The measurements are "immediate" and on refer to water source of the Sibiu Municipality.

6. THE COUNTY WATERS

The results of the waters analysis from Sibiu County area are in frame of normal limits. The average value is of 0.11 Bg/l and the maximum is of 0.13 Bg/l, which represents 5.5% - 6.5% from the attention limit. We collected 4 samples and all 4 were significant.

7. SOIL AND VEGETATION: no radioactivity identifications were made.

CONCLUSION

The radioactivity values of the main environment factors analyzed in the month of February, do not present significant differences comparative with the ones obtained the previous month and are under the attention level established for every environment factor, separately.
The registered differences were because of the evolution of the meteorological factors and sinoptics, without noticing the influence of any artificial pollution.
In conclusion, during the month of February 2008, the environment radioactivity in Sibiu County was placed in normal limits.

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7. Legislatie

EFFECT OF ONE WEEK OF FIBRE SUPPLEMENTATION ON HUNGER AND SATIETY RATINGS AND ENERGY INTAKE

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ABSTRACT

The role of dietary fiber in energy intake regulation and obesity development is related to its unique physical and chemical properties that aid in early signals of satiation and enhanced or prolonged signals of satiety. The goal of this paper is to provide a brief overview of the role of dietary fiber in energy intake regulation, highlighting the relationship between fiber properties and physiologic action.Dietary fiber has many functions in diet, one of which may be to aid in energy intake control and reduced risk for development of obesity. Early signals of satiation may be induced through cephalic- and gastric-phase responses related to the bulking effects of dietary fiber on energy density and palatability, whereas the viscosity-producing effects of certain fibers may enhance satiety through intestinal-phase events related to modified gastrointestinal function and subsequent delay in fat absorption.

KEY WORDS: fiber, food intake, satiety, obesity, viscosity, cholecystokinin

INTRODUCTION

Numerous studies have examined the role of dietary fat, protein and carbohydrate on energy intake control, whereas fewer studies have focused on the role of dietary fiber. The purpose of this paper is to discuss the importance of fiber in the diet as it relates to energy regulation in humans.

The prevalence of obesity has increased dramatically over the past few decades. Obesity is associated with a number of adverse health outcomes and enormous economic costs, causing it to rank as one of the leading public health issues in the U.S. and Westernized countries. Consequently, research efforts have focused on identifying the key factors contributing to the development of obesity with the goal of devising reasonable strategies that will successfully prevent further weight gain and perhaps induce weight loss.

Among the many areas in obesity research, one area has focused on the possible ways in which the composition of the diet may affect food intake regulation and energy balance.

Fiber and obesity development: food intake control. There are several ways in which dietary fiber may affectobesity development. Because obesity representsthe long-term result of an imbalance between energyintake and energy expenditure, the most obvious link betweendietary fiber and obesity development is through its effects onenergy intake control mechanisms. The ingestion of fiber has been hypothesized to suppress energy intake by inducing satiation and satiety. Satiation is defined as the satisfaction of appetite that develops during the course of eating and eventually results in the cessation of eating. Satiation can be quantified by the duration of a meal and/or the size of the meal. In contrast, satiety is the state in which further eating is inhibited and occurs as a consequence of having eaten. The intensity of the satiety response to a meal/food(s) is measured by the duration of time between meals/eating occasions and/or the amount of food consumed at the next meal. Together, satiation and satiety are integral processes controlling food intake and feeding behavior. The means by which dietary fibers influence satiation and satiety are related to their inherent chemical and physical properties, particularly their bulking and viscosityproducing capabilities. Adding fiber to the diet adds bulk, which in turn alters energy density and palatability. The addition of fibers that form viscous colloidal dispersions when hydrated affects multiple aspects of gastrointestinal (GI) function, such as gastric emptying, small bowel transit time, and the digestion and absorption of nutrients, particularly fat and carbohydrate. Hence, dietary fiber has the ability to modify cephalic-, gastric- and intestinal-phase processes of ingestion, digestion and absorption, providing it numerous opportunities to influence satiation and satiety.

Fiber affects gastrointestinal function: means for enhanced satiety. In addition to the effect of dietary fiber on satiation, which appears to be driven primarily by its ability to dilute the energy density of the diet and exploit mechanical threshold and sensory mechanisms of food intake regulation, dietary fiber also has the capacity to affect satiety. Meal-induced signals of satiety are generated both pre- and postabsorptively. However, preabsorptive satiety-related mechanisms, especially those at the level of the small intestine, are essential in the induction and maintenance of satiety. Therefore, prolonging the intestinal phase of nutrient processing and absorption is likely to intensify satiety and aid in food intake control. Incorporation of viscous fibers into a mixed meal at sufficient levels increases the viscosity of GI contents. Increasing viscosity of intestinal contents slows gastric emptying and small bowel transit, interferes with the mixing of food stuffs and digestive enzymes,

disrupts micelle formation, and alters diffusion and interaction of nutrients with mucosal surface. The combination of these events results in slowed fat and carbohydrate absorption, which prolongs the period in which these nutrients can interact with preabsorptive mechanisms of satiety.

Because the small intestine is the primary site for fatinduced satiety, delaying fat absorption and increasing intestinal exposure to fat should intensify its effect on satiety. Indeed, infusing equivalent amounts of fat into the duodenum of rats at a slow rate (extended exposure) compared with a faster rate (time-reduced exposure), resulted in reduced average daily energy intake, altered patterns of feeding and reduced body weight gain. The concept that intraluminal fat exposure is related to satiety and food intake control may illuminate the reason(s) why diets that are low in fat (often those prescribed for the management of diseases such as obesity, cardiovascular and diabetes) are difficult to adhere to long term. Diets low in fat and energy are associated with chronic sensations of hunger, which may be due in part to less fat in the intestine available for stimulation of mechanisms of satiety.

Therefore, slowing dietary fat absorption to enhance satiety, especially when fat levels are low, may have a significant effect on the overall therapeutic benefit of low fat diets because adherence may be maintained long term. If inclusion of viscous type fibers in low fat diets will effectively slow fat absorption and impart a greater sense of satiety, this would be a reasonable dietary approach to aid in successful adoption of low fat diets. We recently investigated this potential interaction of fat and fiber in meals to influence postmeal satiety. The data indicated that in women, incorporation of foods rich in viscous fibers into mixed low fat meals (20% energy from fat) resulted in suppressed sensations of hunger and enhanced postmeal satiety compared with an equally energetic and palatable low fat, low fiber meal. Moreover, the satiety response to the low fat, high fiber meal was similar to that of a high fat (38% energy from fat), low fiber meal with similar energy content. Analysis of plasma cholecystokinin (CCK) concentrations in response to these meals showed a similar pattern, in that elevated and sustained CCK concentrations were observed with both the low fat, high fiber meal and the high fat, low fiber meal. Others have shown a similar sustained CCK response above baseline CCK concentrations when viscous fibers were included in a low fat meal. Because CCK release is sensitive to fat in the small intestine and is a proposed mediator of fat-induced satiety, the results from these studies are consistent with the idea that delaying fat absorption from the intestine can improve satiety of meals lower in fat.

Fiber, energy density and palatability: means for enhanced satiation. The importance of energy density on satiation and satiety has been reviewed recently. Briefly, energy density is defined as the number of kilojoules per unit

weight of food. The energy density of foods can range from 0 to 37 kJ/g of food. Water, fat and fiber are the main food constituents contributing to energy density, whereas sugar and protein take on a lesser role, except in some reduced- or modified-fat food products. In general, fiber-rich diets, whether achieved through fiber supplementation or incorporation of high fiber foods into meals, have a reduced energy density compared with high fat diets. This is related to fiber's ability to add bulk and weight to the diet. Therefore, for a given weight or volume of food, fiber can displace the energy of other nutrients. If people consume a constant weight of food rather than a constant quantity of energy, as some studies have suggested, then addition/incorporation of fiber into the diet is one strategy for inducing fullness or satiation while consuming less energy. The underlying hypothesis is that gastric capacity along with sensitive mechanoreceptors to gastric distention is key in the regulation of food intake.

Fiber's effect on palatability, as well as other sensory qualities of the diet, may affect energy intake. Bulky, low energy-dense foods/diets are, for the most part, less appealing than more energy-dense foods or diets because energy density and palatability have been shown to be correlated. Therefore, the energy-diluting effects of dietary fiber may reduce energy intake by lowering the overall palatability of the diet. The effect of dietary fiber on other qualities of food(s), such as texture may also reduce energy intake. Textural qualities of some fibrous foods may increase the work effort and time required for mastication. This increase in chewing effort and time may result in a variety of cephalic- and gastric-phase responses and signals, leading to early satiation and reduced food intake.

Fiber, satiation, satiety and energy intake: a look at the data. There is sufficient evidence to suggest that through the action of fiber at different levels of the GI tract, the inclusion of fiber in the diet should promote food intake control. Numerous studies have investigated the effect of fiber on satiation and satiety as well as subsequent food/energy intake. For the most part, these studies have been short-term feeding trials using a preload-type design to investigate effects of fiber isolates, fiber-supplemented foods or mixed meals containing fiber-rich foods. The results from these trials vary, depending on the population being studied, the type, dose and mode of fiber administered as well as the timing of food intake assessment relative to treatment. Despite the differences in approach, a significant number of studies have demonstrated suppressed hunger and greater satiety with fibers that have the viscous-producing property, whereas satiation and gastric fullness may be more closely related to the bulking effects of fiber. The subsequent effect on food intake has been more variable because in some cases, food intake at a test meal was reduced, in other cases, it was not. Although much of the discrepancy in results may be ascribed to differences among studies, different

responses related to gender and body weight status (i.e., obese vs. normal weight) may also be responsible. With regard to gender, work in our laboratory indicates that women may be more sensitive to dietary manipulation with fiber than men, which is consistent with a previous report by Burley et al. (1993).

Moreover, we have found that the subjective satiety response to dietary manipulation in men and women is supported by differences in the CCK response, suggesting that signals for satiety differ between genders. The relationship of body weight status and fiber effect on energy intake suggests that obese individuals may be more likely to reduce food intake with dietary fiber inclusion. However, many more studies will be required to establish this relationship firmly by comparing directly the effects of fiber between normal weight and obese subjects. Nonetheless, the data highlight the importance of understanding how fiber or the different types of fiber may influence food consumption behavior in different groups of people. This information is valuable for developing and successfully implementing dietary strategies aimed at food intake and body weight control.

Fiber and weight loss. Few long-term studies have been conducted to determine the effect of fiber on body weight loss. Most have examined the usefulness of fiber in enhancing compliance with diets designed for weight loss by reducing hunger (i.e., low or very low calorie diets).

With the exception of Heini et al. (1998), the major conclusion drawn from these trials was that subjects found it easier to adhere to the weight loss diets when fiber was part of the dietary regimen. The lack of effect reported in the study by Heini and co-workers may have resulted from the use of hydrolyzed guar gum, which would have removed the viscosity effect of the fiber, an important component of fiber-related satiety. The usefulness of long-term fiber supplementation to induce or maintain weight loss under unrestricted conditions is not clear.

CONCLUSIONS:

The relevance of fiber in obesity development is centered around fiber's role in food intake control.

Dietary strategies aimed at promoting health and encouraging weight maintenance or loss should consider the benefits of dietary fiber and its related properties.

There are many well-established benefits of consuming a diet rich in fiber. One of these benefits is the associated lower risk for certain diseases such as obesity. Inclusion of fiber in the diet promotes satiation and prolongs satiety, aids in long-term compliance to low energy diets, and encourages "healthy" food choices and eating habits.

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REVIEW OF THE BIOLOGY OF QUERCETIN AND RELATED BIOFLAVONOIDS

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ABSTRACT

The present paper is a study about the role of quercetin and other flavonoids as antioxidants. Also is presented the mechanism of flavonoids metabolism pathways.

Key words: quercetin, flavonoids, antioxidants, mechanism

INTRODUCTION

Antioxidants are compounds that protect cells against the damaging effects of reactive oxygen species, such as singlet oxygen, superoxide, peroxyl radicals, hydroxyl radicals and peroxynitrite. An imbalance between antioxidants and reactive oxygen species results in oxidative stress, leading to cellular damage. Oxidative stress has been linked to cancer, aging, atherosclerosis, ischemic injury, inflammation and neurodegenerative diseases (Parkinson's and Alzheimer's). Numerous studies have demonstrated in vivo effects of flavonoid components from fruits and vegetables on various measures of oxidative cellular damage.

Epidemiological studies have shown that flavonoid intake is inversely related to mortality from coronary heart disease and to the incidence of heart attacks. Flavonoids may help provide protection against these diseases by contributing, along with antioxidant vitamins and enzymes, to the total antioxidant defense system of the human body.

QUERCETIN AND OTHER FLAVONOLS AS ANTIOXIDANTS

The flavonol quercetin (3,3_,4_,5,7-pentahydroxyflavone) is one of the most abundant dietary flavonoids and has been one of the most frequently studied flavonoids. Data on the quercetin content of foodstuffs are limited, but the available data suggest a range of 2–250 mg quercetin/kg wet weight in fruits; 0–100 mg/kg in vegetables, with onions being especially high (200–600 mg/kg); 4–16 mg/L in red wine; 10–25 mg/L in tea; and 2–23 mg/L in fruit juices (35, 36). However, the extent of absorption of flavonoids such as quercetin is a critical issue relative to the many alleged health effects. Quercetin and other flavonoids have been shown to modify eicosanoid biosynthesis (antiprostanoid and anti-inflammatory responses), protect low-density lipoprotein (LDL) from oxidation (prevention of atherosclerotic plaque formation), prevent platelet aggregation (antithrombic effects), and promote relaxation of cardiovascular

smooth muscle (antihypertensive, antiarrhythmic effects). In addition, flavonoids have been shown to have antiviral and anticarcinogenic properties.

ANTIOXIDANT CAPACITY OF FRUITS AND VEGETABLES

Flavonoids are plant polyphenolic compounds ubiquitous in fruits, vegetables, and herbs. Flavonoids are primarily categorized into flavonols, flavones, flavanols, flavanones, and anthocyanidins. The daily intake of flavonoids in Western countries has been estimated to be between 0.5 and 1.0 g (4) but likely is much lower than this.

Reactive oxygen species from both endogenous and exogenous sources may be involved in the etiology of diverse human diseases, such as coronary artery disease, stroke, rheumatoid arthritis, and cancer. Diets rich in fruits and vegetables are associated with a reduced risk for these pathologies (1–3), and protection has often been attributed to antioxidant vitamins such as vitamin C, vitamin E, and _-carotene. Although fruits and vegetables are primary sources for these "nutrient" antioxidants, other dietary components may also be important protective agents.

Over 4,000 flavonoids have been identified, many of which occur in fruits, vegetables and beverages (tea, coffee, beer, wine and fruit drinks). The flavonoids have aroused considerable interest recently because of their potential beneficial effects on human health-they have been reported to have antiviral, anti-allergic, antiplatelet, anti-inflammatory, antitumor and antioxidant activities.

Flavonoids are polyphenolic compounds that are ubiquitous in nature and are categorized, according to chemical structure, into flavonols, flavones, flavanones, isoflavones, catechins, anthocyanidins and chalcones.

The oxidation of low-density lipoprotein (LDL) has been recognized to play an important role in atherosclerosis. Immune system cells called macrophages recognize and engulf oxidized LDL, a process that leads to the formation of atherosclerotic plaques in the arterial wall. LDL oxidation can be induced by macrophages and can also be catalyzed by metal ions like copper. Several studies have shown that certain flavonoids can protect LDL from being oxidized by these two mechanisms.

The hydrophilic antioxidant capacity of fruits and vegetables has been determined using the oxygen radical absorbance capacity assay. In general, the hydrophilic antioxidants account for more than 85% of the total antioxidants in fruits and vegetables, and antioxidant capacity of different fruits and vegetables may differ by a factor of 20-fold or more. This might suggest, from a standpoint of protecting against oxidative events in the body, that fruits or vegetables that have a higher antioxidant capacity should be more effective.

In some fruits, anthocyanins make a major contribution to the total antioxidant capacity. Dietary intake of anthocyanins may exceed 200 mg/d in individuals consuming several servings of fruit, but the "usual" intake is likely

much less. The flavonols, and in particular quercetin, are ubiquitous in fruits and vegetables and contribute to antioxidant capacity. However, in some fruits or vegetables, there may be more than 100 compounds that can be separated by HPLC that can contribute to the measured antioxidant capacity. Thus, by narrowing our focus to a few compounds in this review, we may not be considering the full potential of fruits and vegetables.

The capacity of flavonoids to act as antioxidants depends upon their molecular structure. The position of hydroxyl groups and other features in the chemical structure of flavonoids are important for their antioxidant and free radical scavenging activities. Quercetin, the most abundant dietary flavonol, is a potent antioxidant because it has all the right structural features for free radical scavenging activity. The proposed pathways of quercetin absorption/metabolism is presented in figure 1.
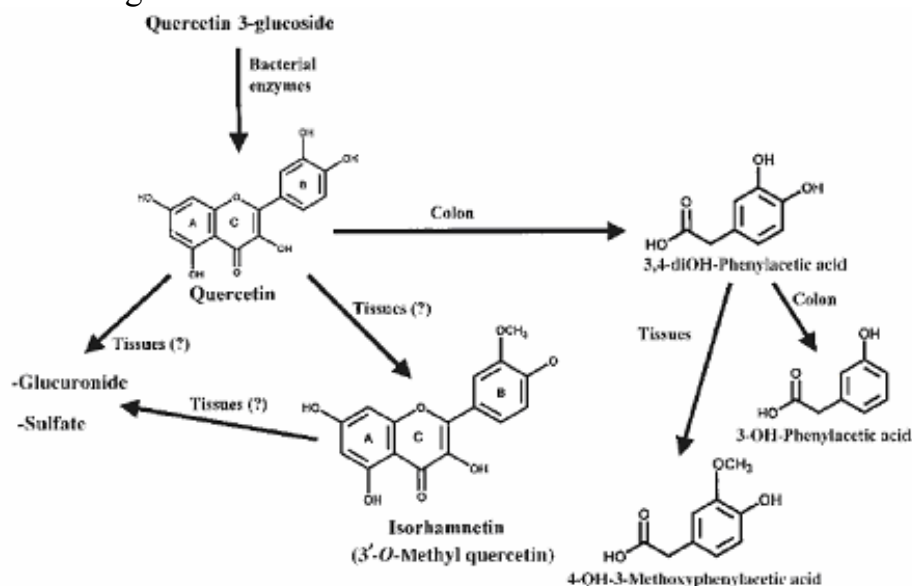
Fig. 1. Proposed pathways of quercetin absorption/metabolism.

Some common pathways of metabolism of flavonoids are emerging that can affect in vivo antioxidant capacity. Methylation in the 3-position of both cyanidin 3-glucoside and quercetin will decrease the antioxidant capacity of the metabolite. Further conjugation with glucuronide or sulfate may also affect antioxidant capacity depending on the position that is conjugated. Even though quercetin is conjugated during the absorption process, the conjugates still seem to retain antioxidant activity. Measurement of in vivo antioxidant effects of a single flavonoid compound appears to be difficult except at fairly high consumption rates. With whole foods, antioxidant effects may be more easily demonstrated, and the mixture or synergy between compounds in foods may have added benefit.

To assess the antioxidant activity of the prenylated flavonoids, we-in collaboration with LPI researchers-evaluated the capacity of these flavonoids to

inhibit the oxidation of LDL by copper. The antioxidant properties of the prenylflavonoids were compared to those of quercetin (a flavonol), genistein (the major isoflavone in soy), chalconaringenin (a non-prenylated chalcone), naringenin (a non-prenylated flavanone), and vitamin E. The possible interaction of xanthohumol, the major prenylchalcone in beer, with vitamin E to inhibit LDL oxidation induced by copper was also examined. The observation that prenyl groups are important in conferring antioxidant activity to certain flavonoids may lead to the discovery or synthesis of novel prenylated flavonoids as preventive or therapeutic agents against human diseases associated with free radicals. Our encouraging results with xanthohumol suggest that this prenylchalcone should be further studied for its antioxidant action and protective effects against free radical damage in animals and humans.

CONCLUSIONS

In animal models, dietary anthocyanins at relatively high doses (1–2 mg/kg diet) are protective against oxidative stress. In humans, anthocyanins appear to have some vasoprotective effects, but whether these are the result of antioxidant mechanisms is not clear.It is clear that under in vitro assay conditions, both anthocyanins and flavonols clearly can function as antioxidants. However, in vivo, anthocyanin absorption appears to be at least an order of magnitude lower than for the flavonol quercetin. Whether anthocyanins get into cells or into an appropriate subcellular compartment in sufficient concentrations to affect metabolic processes is not known.

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STUDIES REGARDING THE TERATOGENETIC ACTION OF COLISTIN, AN ANTIBIOTIC OF THE POLYMIXINE GROUP

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ABSTRACT

The aim of the present paper is the one of emphasizing the eventual unwished actions of Colistin medicine (injectable form – sodium metansulphonate) upon embryo and fetuses during the intra uterine development, within different pregnancy stages and in successive generations in experimental animals – white rats and mice.

Durind the trials, it has been in view the appearance of some effects as: the medicine action on white rats reproductive process; the number of implants under the action of this product, after its administering along the first three days of pregnancy (egg nidation); the effect of the product at the same period upon the pregnancy term and embryo and fetuses along the intra uterine development and after it; the action of Colistin sodium metansulphonate along the last three days of pregnancy, the 18-19 days in white mice; the effects of the products along the three successive generations.

KEYWORDS: teratogeny, Colistin.

INTRODUCTION:

The study of medicinal fetal toxicity has increased considerably after some catastrophes which remained within the history of medicine (Salk vaccine paralizia, 4000 children who got all their life the print of Thalidomide).

The major problem is the one of knowing how is the embryo toxic or teratogenetic effect on fetus by mother's way, taking into consideration the two biologic systems, the mother's or fetus's and the placenta which separate but also join the two organisms.

Within the experimental teratology the things become more complicated due to the specific features linked to the chosen lab animal, primates or rodentias, their analogy is not completed, the evolution during organogenesis, the vitellin and choryo-alantoidian structure varies to each speacies. For example, Thalidomide determines malformations in mouse, rabitt and human but not in rat.

The moment of administering is very important, because it may affect or not the embryo development. In the species with placenta, the main condition is that the substance passes the placentarion barrier.

MATERIAL AND METHODS:

Colistin makes very well definited salts used in practice: colistin sulphate and natrium metansulphonate.

Colistin sulphate is used per os (it is not absorbed and it could not be analyzed the sistemic action) and the natrium metansulphonate, parenteraly.

The dosages is made in units: 1 mg colistin corresponds to almost 20 000 I.U. for sulphate colistin and 12 500 I.U. for colistimetat.

The experience animals were chosen so that the ones for mating be in the estrus stage, for each female this stage was identified by vaginal secretions analyzes (fixed by heat and coloured by blue metylen.

After these examinations there were mated 2 females and a male, for rats and also white mice; knowing that the estral stage in these species lasts 15-18 hours it is possible the analyzing the pregnancy days to calving.

The product was administered in a dose of 1/20 aut of DL_{50}, thus:

$$DL_{50} = 650 \text{ mg/Kg}$$
1 mg equivalent to 12 500 I.U. Colistin

Conformingly the mathematic calculation we established that the dose being 32,5 mg/kg, intramuscular. The medicine administering was carried out upon the following:

- firstly, before mating over 5 days (5 doses totally) for establishing the fertility index of cubs (taking into consideration the number of alive cubs after 4 days);
- during the first 3 days of pregnancy (3 doses) for checking the number of uterins wall implantation (first phase of embryogenesis); the females were sacrificed in the III-rd day of pregnancy;
- during the first 3 days of pregnancy for establishing the action of the product along blast implantation, organogenesis and especially during the fetal period by analyzing the pregnancy interval, the number of cubs, the number of intrauterine deaths (deaths at calving or after it) and eventually some alterations during development;
- during the 10-11-12 days of pregnancy (the period of organs differentration) and in the last days of pregnancy6, the 18-th and 19-th days in white mice.

RESULTS AND DISCUSSIONS:

The establishing of the number of implantations in the third day of pregnancy

The experiment was carried out on white rats. After slaughtering the pregnant animals, the uterine horns were sampled and cut and introduced in ammonium sulphate 10%, for 10 minutes. After washing the organs were imersed into hydrochloric acid 1% and ferocianat de K 20%, in equal parts.

The rezults' interpretation was carried out by microscopic examination (Stereo/Zeiss microscope) of blast implantation place on the uterine wall, area coloured in blue-black (table 1).

Table 1

Implantation number in the third pregnancy day (experiment on white rats)

Medicine	No of pregnant females	Body weight	Adminis-tering way	Dose	No of implan-tations	Observations
Control group Physiologic serum	10	168.7	i.m.	0.3 ml	56	All fetuses died Intrauterine death
Colistin	8	134.15	i.m.	32.5 mg/kg	18	All fetuses died Intrauterine death

The Colistin product action on white mice reproduction

For analyzing the action of the product during organogenesis, this was administered daily, for 5 days, in white rat females, before mating; after 5 days of treatment, the females in the estrus were mated (2 females for a male). There were analysed the folowing parameters: the number of pregnant females, the fertility index, the average number of cubs and the viability index after 4 days after cubs birth. (Table 2)

The fertility and viability indexes were calculated by the folowing formulas:

Fertility index = no of pregnant females/no of mated females x 100

Viability index = no of alive cubs at 4 days after birth/no of total cubs x 100

From the results shown in table 2, it is noticed a lower fertility index (40%) in females treated with Colistin, beside the control group (60%).

From the dead cubs or dead after birth there were sampled the internal organs, which were fixed in formol 10%, included in paraffin and the sections of 7μ were coloured by haematoxilin – eozine, without noticing teratogenic alterations.

Table 2

Fertility and viability indexes under the action of Colistin antibiotic in white female rats

Group	No of mated fema-les	No of pregnant females	Fertility index %	Total of cubs	Cubs average/ animale	No of alive cub sat 4 days after birth	Viabi-lity index %
Physio-logic serum	15	9	60.0	62	6.88	60	93.54
Colistin	15	6	40	41	6.83	36	87.8

For a more safety of the obtained data, the same experiment was carried aut on white mice. The results are shown in table 3.

Table 3

Fertility and viability index under the action of Colistin antibiotic in white female mice

Group	No of mated fema-les	No of pregnant females	Fertility index %	Total of cubs	Cubs average/ animale	No of alive cub sat 4 days after birth	Viabi-lity index %
Phyzio-logic serum	10	10	100	70	7	69	98.57
Colistin	10	8*	80	48	6	46	95.83

* 2 females aborted

The obtained results revealed superior values of fertility indices in control groups comparatively the ones in the experiment on rats, but without significant differences.

Colistin administration in the first three pregnancy days

Table 4

Colistin action administered in the first 3 days of pregnancy (experiment on white rats)

Medicine	No of pregnant females	Average no of alive cubs	No of cubs dead at birth	Average weight on birth -g-	Average lunght on birth (cm)	Observations
Physiologic serum	5	8	0	6.2	4.8	-
Colistin	5	7	6	6.0	4.8	2 females gave birth 2 females died 1 female was sacrified – 1 dead foetus in the late fetal period

After administering the dose of 1/20 aut of DL_{50}, the pregnant rat females were analyzed during the whole pregnancy, 21-23 days. The obtained results are shown in table 4.

Product administering in the days 10-11-12 of pregnancy (period of organs differentation)

There were carried out repeated administering in the days 10-11-12, experiment on white mices; it is the moment when at fetus there are formed the thiroid gland and the pulmonary germ, the intestinal herniation. After this period it starts the bones formation in these laboratory animals.

There are not noticed significant alterations of the studies parameters, after Colistin administering in the 10-11-12 days of gestation, table 5.

Table 5

Colistin action administered in the 10-11-12 days of pregnancy
(experiment on white mice)

Medicine	No of pregnant females	Dose Administering way	Average no of alive cubs	No of cubs dead at birth	Average weight on birth -g-	Average lenght on birth (cm)
Physiologic serum	10	0.3ml/i.m.	6.2	0	1.95	3.15
Colistin	12	32.5mg/kg i.m.	6	3	1.87	3.10

Colistin administering in the latest days of pregnancy (days 18-19)

The experiment was carried out on white mice.

The females in the control group has given birth normally , as average value 6,5 alive cubs/animal. The average weight at birth was 1,92 g/cub, and average lenght 3,0 cm (table 6).

From the 10 females treated with Colistin, one aborted and the other 9 given birth 50 alive cubs and 5 dead cubs. At 4 days after birth there were alive 45 cubs. The viability index was 90,0%.

Table 6

Colistin action administered in the 18-19 days of pregnancy
(experiment on white mice)

Medicine	No of pregnant females	No of dead cub sat birth	Dose and administering way	Total cubs	No of cubs	Morphologic alterations	Average weight at birth -g-	Average length at birth (cm)
Physiologic serum	10	0	0.3ml i.m.	6.5	6.5	-	1.92	3.0
Colistin	10	5	32.5 mg/kg i.m.	6.1	5.5	-	1.87	3.0

CONCLUSIONS:

1. Natrium metansulphonate Colistin has produce pain at administering.
2. The product has a negative action upon the fertility index (40%) comparative the control groups (60%). Conformingly the studies references there were not described fertility alterations, so this experiment will be acted again.
3. The viability index presents an easy lower value in the experimental group (87,8%) comparatively the control group (93,54%).
4. The Colistin administered during the first three pregnancy days determined a decreasing of the number of implantations in rats (18%) beside the control group (56%).
5. The product administering in the first embryo genesis period in non-sacrificed pregnant females established the delay of birth with the pregnancy prolonging, the birth with non-viable products (one intrauterine dead foetus).

6. The product administered in the 10-11-12 days of pregnancy did not induce significant alterations of the studied parameters in the alive born cubs.

7. During the reserches were not noticed congenital malformations under the action of Colistin, but the decreasing of the fertility index and of the implantation number, the recorded deaths make that this product be not indicated to pregnant females in the first period of pregnancy and with 10 days before mating.

We consider that it could be used succesefully in the last pregnancy period and after birth.

General conclusions regarding the second and the third generations of white rats analysed in the teratogenetic experiment

After closing the experiments on the first generation, the alive cubs were grown-up, mated and continuosly studied.

The general results could be concluded:

1. The fertility index is easy lower than the control group-one.
2. The implantation number is easy lower than the control group one.
3. No cub at any generation it was not noticed with macroscopic congenital malformations.
4. The vital sampled organs–liver, kidney, heart, lungs, fixed in 10% formol, included in paraffin and coloured in haematoxilin-eosine did not presented morphologic alterations in any white mice and rats generation.

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USE OF GENETIC MARKERS TO IMPROVE THE BROWN CATTLE

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ABSTRACT
Genetic markers are one of the methods to assess the productive capacity of an animal and to evaluate its breeding value, whose identification allows determining the genotypes of that particular population and the correlations with animal performance. The investigation involved 40 Maramures Brown dairy cows from Albota farm. The animals were monitored throughout their first lactation determining the total amount of milk, the fat content and fat amount, the protein content and the protein amount. The genetic markers considered by the investigation were the haemoglobin and β lactoglobulin. The simultaneous analysis of the two studied markers reveals the superiority of the heterozygous cows HbA HbA/LgBLgC, which displayed the highest productive performance in three of five traits (milk fat amount, milk protein and milk protein amount).

Keywords: genetic marker, dairy cow, the haemoglobin, β lactoglobulin

INTRODUCTION

Among the modern methods assessing the productive capacity of the animals and of their breeding value is the use of biochemical markers whose identification allows the determination of the population's genotypes and the correlation with the productive results.

MATERIAL AND METHODS

The biological material for the study consisted on 40 Maramures Brown dairy cows. The animals were monitored during their first lactation, determining the total milk yield, milk fat, milk protein (g and %). The total milk yield was determined by the ANARZ methodology. Milk fat and milk protein were determined by Milkoscaner. The genetic markers under study were the haemoglobin and the β-lactoglobulin.

The genotype categories were identified by vertical electrophoresis using polyacrylamide as migration carrier (1, 2, 3). Genotype frequency was determined by relating the number of individuals with the same genotype to the total number of individuals in the population.

The data were processed statistically by variance analysis.

RESULTS AND DISCUSSION

For the haemoglobin marker (Table 1), the frequency of the observed genotypes was 0.8 for the homozygous genotype $HB^A HB^A$ (P) and 0.2 for the heterozygous genotype $HB^A HB^B$ (Q). The frequency of gene A (p) was 0.9 and the frequency of gene B (q) is 0.1.

Table 1

Gene frequency at the haemoglobin locus

Genotype	$HB^A HB^A$	$HB^A HB^B$	$HB^B HB^B$	Total
Genotype frequency	0.8	0.2	0	1
No. of genes	A 72		B 8	80 genes
Gene frequency	p (gene A) 0.9		q (gene B) 0.1	Total 1.0

For the β-lactoglobulin marker, the frequency of these genotypes was: 30% $LGB^A LGB^A$, 55% $LGB^A LGB^B$, 10% $LGB^B LGB^B$ şi 5% $LGB^B LGB^C$ (table 2). Gene frequency was 0.575 for A (p): 0.400 for B (q) and 0.025 for C (r).

Table 2

Gene frequency at the β-lactoglobulin locus

Genotype	LGB^A LGB^A	$LGB^A LGB^B$	$LGB^B LGB^B$	$LGB^B LGB^C$	Total
Genotype frequency	0.30	0.55	0.10	0.05	1
No. of genes	A 46	B 32	C 2		Total 80
Gene frequency	p=0.575	q=0.400	r=0.025		1

Table 3 shows the results at the haemoglobin locus.

Table 3

Average performance of the Brown dairy cows at the haemoglobin locus

Genotype	Milk yield $\overline{X} \pm S\overline{X}$	Milk fat, % $\overline{X} \pm S\overline{X}$	Milk fat, g $\overline{X} \pm S\overline{X}$	Milk protein, % $\overline{X} \pm S\overline{X}$	Milk protein, g $\overline{X} \pm S\overline{X}$
$HB^A HB^A$	3951.30 ±99.73	4.05 ±0.04	160.21 ±4.18	3.44 ±0.015	136.08 ±3.23
$HB^A HB^B$	3794.30 ±200.53	4.13 ±0.10	156.21 ±7.59	3.39 ±0.04	129.13 ±7.35

A simultaneous analysis for the five studied traits reveals the superiority of the individuals with type A haemoglobin, which rankled on the top position in 4 of the 5 analysed traits: milk yield, milk fat (g), milk protein (g, %).

The productive results at the β-lactoglobulin locus are shown in Table 4.

Table 4

Average performance of the Brown dairy cows at the β-lactoglobulin locus

Genotype	Milk yield $\overline{X} \pm S\overline{X}$	Milk fat, % $\overline{X} \pm S\overline{X}$	Milk fat, g $\overline{X} \pm S\overline{X}$	Milk protein, % $\overline{X} \pm S\overline{X}$	Milk protein, g $\overline{X} \pm S\overline{X}$
Lg^A/Lg^A	3907.40 ±141.66	4.10 ±0.07	163.18 ±6.87	3.47 ±0.03	135.48 ±4.72
Lg^A/Lg^B	3897.90 ±131.18	4.17 ±0.05	155.56 ±4.82	3.42 ±0.02	133.49 ±4.37
Lg^B/Lg^B	4007.00 ±297.61	4.14 ±0.14	164.4 ±11.96	3.37 ±0.05	135.4 ±9.84
Lg^B/LgB^C	4219.00 ±302.04	3.99 ±0.14	175.00 ±12.20	3.51 ±0.05	148.00 ±5.67

In order to draw a conclusion of which of the seven categories of dairy cows, determined according to the genotypic combinations at the haemoglobin and β-lactoglobulin loci, was best, we determined the average performance for each category and analysed trait. Table 5 shows the results of this analysis.

Table 5

Average performance of the Brown dairy cows at the haemoglobin and β-lactoglobulin loci

Genotype	Milk yield $\overline{X} \pm S\overline{X}$	Milk fat, % $\overline{X} \pm S\overline{X}$	Milk fat, g $\overline{X} \pm S\overline{X}$	Milk protein, % $\overline{X} \pm S\overline{X}$	Milk protein, g $\overline{X} \pm S\overline{X}$
Hb^AHb^A/Lg^ALg^A	3784.33 ±159.02	4.29 ±0.06	162.85 ±8.43	3.49 ±0.02	132.25 ±5.083
Hb^AHb^A/Lg^ALg^B	3976.58 ±142.23	3.94 ±0.04	156.80 ±5.41	3.43 ±0.02	136.53 ±4.62
Hb^AHb^A/Lg^BLg^B	4219 ±316.72	3.90 ±0.13	168.90 ±15.67	3.34 ±0.05	140.77 ±11.66
Hb^AHb^A/Lg^BLg^C	4203 ±266.50	4.14 ±0.14	175.00 ±12.08	3.51 ±0.06	148.00 ±12.40
Hb^AHb^B/Lg^ALg^A	4184.25 ±268.78	3.95 ±0.09	163.92 ±13.68	3.40 ±0.05	142.75 ±10.47
Hb^AHb^B/Lg^ALg^B	3399.33 ±167.34	4.41 ±0.12	147.70 ±9.14	3.36 ±0.041	114.27 ±5.99
Hb^AHb^B/Lg^BLg^B	3419.00 ±180.60	4.34 ±0.20	150.90 ±5.50	3.48 ±0.06	119.30 ±6.20

Analysing simultaneously the five types of surveyed traits, we ob served that genotype Hb^AHb^A/Lg^BLg^C is characterised by the best performance in 3 of

the 5 analysed traits (milk fat, g, milk protein, g and %). This category ranked second for the milk yield trait.

CONCLUSIONS

1. At the *haemoglobin* locus, two types of migration were observed by electrophoresis, corresponding to two genotypes Hb^A/Hb^A and Hb^A/Hb^B. Gene frequency was 0.9 for gene Hb^A and 0.1 for gene Hb^B.

2. At the *β-lactoglobulin* locus, four types electrophoretic movements were noticed, determined by genotypes LGB^A/LGB^A, LGB^A/LGB^B, LGB^B/LGB^B and LGB^B/LGB^C. Gene frequency was: 0.575 for gene LGB^A; 0.400 for gene LGB^B; 0.025 for gene LGB^C.

3. The simultaneous analysis for haemoglobin and lactoglobulin revealed the superiority of $Hb^A Hb^A/Lg^B Lg^C$ group in 3 of the 5 analysed traits (milk fat, g, milk protein, g and %). This category ranked second for the milk yield trait.

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THE USE OF CANOLA MEAL IN BROILER DIETS

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ABSTRACT
Rapeseed Canola whole grains and meal are important energy and protein sources for poultry, because the contents of antinutritional factors is lower. The experiment used 400 one day-old male chicks raised on flour. The birds with similar weights were assigned to a control group and 3 experimental variants. The birds had free access to water and to 2 types of diets: a prestarter diet (1 to 7 days) given to all groups and a grower-finisher diet (8 to 42 days) differentiated according to variants. Canola meal replaced 10% of the soybean meal in experimental group 1 (E1), 25% in E2 and 35% in E3. The broiler performance at 28 and 42 days was strongly influenced by the extent of soybean meal and especially fish meal replacement with canola meal. The use of 3.5% canola meal in broiler diets was determined performances similar with the control. The higher levels of canola meal to replace 35% of the soybean meal depressed body weight by 9% (p ≤ 0.05).

Keywords: rapeseed Canola, broiler, diets

INTRODUCTION

Rapeseed Canola whole grains and meal are important energy and protein sources for poultry; because the contents of antinutritional factors is lower (Nwokola et al 1999).

Due to its dietary quality, its flavour and low price, broiler production increased worldwide during the recent period. Although broiler production costs are much lower than the production costs for pork or veal, 60-65% of the production costs are accounted for by forages, protein feeds being the most expensive.

The commonly used sources of vegetal protein include soybean meal, sunflower meal, ground nul meal and rapeseed meal, the last one not being used for a long period due to its high content of erucic acid, glucosinolates, tanins and fibre, and to its low content of methionine and arginine (Leeson et all, 1987).

Both rapeseed whole grains and rapeseed meal are important energy and protein sources for poultry which, however, can not be fully used by the birds due to the high content of fiber and tanins which act as antinutritional factors, the latter causing proteins to precipitate depressing thus the general digestibility and especially protein digestibility (Larbier and Leclerq, 1994).

MATERIALS AND METHOD

The experiment used 400 day-old male chicks Cobb raised on flour divided in 4 groups.

The initial weight of the chicks was between 53 g. The birds had free access to water and to 2 types of diets: prestarter diet (1 to 7 days) given to all groups and grower-finisher diet (8 to 42 days) differentiated according to variants.

The basal ingredients were included in different proportions to each experimental variant and to the control group. Canola meal was added in different proportions to the experimental groups only (Table 1). In experimental group 1 (E1), canola meal replaced 10% of the soybean meal, 25% in E2 and 35% in E_3.

The limiting aminoacids were supplied in adequate amounts by addition of synthetical methionine and lysine

The chicks were weighed on days 21 and 42, when the control slaughtering was performed.

Protein was analysed by using Kjeldahl's method with a Kjeltec-Tecator, the fiber was analysed by Weende's method with a Fibrtec-Tecator, the fatty acids were analysed by gas chromatography with a detector with flame ioniza-tion, the ether extractives were analysed by Soxhlet's method and tanins were analysed by the oxydimetric method, by titration with potassium permanganate.

Table 1

Experimental design

	C	E1	E2	E_3
Broiler (no.)	100	100	100	100
Experimental days	42	42	42	42
Starter (1-7 days) CP%	23.0	23.0	23.0	23.0
Metabolisable energy MJ/kg	12.55	12.55	12.55	12.55
Grower/finisher (8-42 days) CP%	20.78	20.56	19.72	18.81
Metabolisable energy MJ/kg	13.02	13.07	13.02	13.31
Canola meal (%)	0	3.5	7.0	10.50

RESULTS AND DISCUSSION

The broiler performance at 28 and 42 days was strongly influenced by the extent of soybean meal replacement with canola meal. The weight (table 2) at 28 d of E1 broilers (3.5% canola meal) was 1005.35 ± 2.72 g similar to the control group 1002.12 ± 2.83 g. The higher rates of canola meal inclusion (7% in E2

replacing 25% of the soybean meal) depressed broiler weight by 2.0%, the average weight being 977.07 ± 3.02 g. The level of 10.5% canola meal in E3 replacing 35% of the soybean meal depressed broiler weight by 4% compared to control, the average weight being 962.03 ± 3.27 g.

The differences in weight maintained at 42 days too (p > 0.05) was noticed as compared to the control (probably due to the rapeseed oil content of polyunsaturated fatty acids and to the high concentration of linolenic acid): 1984.36 ± 7.33 *vs.* 1901.46 ± 7.21 g respectively. The average weight of all the other variants was much lower than the control: 1868.71 ± 7.53 g E2 (p > 0.05), 1805.95 ± 7.63 g E3 (p ≤ 0.05).

The feed conversion ratio varied between treatments and compared to the control: C - 2.13; E1 - 2.10; E2 - 2.15; E_3 - 2.18 kg CF/kg gain.

Table 2

Broiler performance

	C	E1	E2	E3
Live weight at 28d (g)	1002.12 ±3.12	1005.35 ±2.90	977.07 ±3.02	962.03 ±3.44
%	100	100.3	97.5	96.0
Gain at 28 d (g/day)	32.5	32.6	31.8	31.23
Live weight at 42 d (g)	1984.36 ±7.33	1901.46 ±7.21	1868.71 ±7.53	1805.95 ±7.63
%	100	95.8	94.2	91.0
Gain at 42 d (g/day)	37.5	37.9	36.8	36.7
Feed/gain (kg CF/kg gain)	2.13	2.10	2.15	2.18
Livability (%)	98.6	96.8	98.6	98.0

CONCLUSIONS

The use of 3.5% and 7% canola meal in broiler diets determinate the weight gain and feed conversion equal statistically to the control. The higher levels of inclusion of canola meal to replace 35% of the soybean meal depressed body weight by 9%.

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ENVIRONMENT PROTECTION – DOMAIN FOR THE APPLICATION OF ECONOMIC RESEARCH ON SOILS

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ABSTRACT

Ecological agriculture could not have developed without knowing its bases, namely fundamental knowledge of ecology, agro-ecology and environment protection. Through Romania's integration into the European Union, Romanian producers have the possibility to take over a significant segment of the European Union market with their ecological agrifood products. At European level, the appearance of ecological agriculture was due first of all to the scientists' becoming aware of the impact of intensive agriculture on the environment, on the health of the population consuming products from the chemicalised agriculture. At the same time, the consumers' awareness of a healthier diet was raised, as well as their responsibility to the environment, which eventually contributed to the creation of organic farms.

A great importance in Romania will be placed also on ecological animal science, which will be able to enter the European market as a result of its advantages. A fundamental principle in supporting ecological animal science is that ecological agriculture cannot exist without animal science, because animals produce the organic waste absolutely necessary in fertilising soils and renewing nutritive principles exported to the vegetal production. The products resulting from ecological agriculture are considered agricultural products whose production, conservation and transformation are performed without using synthesis chemicals. In this production system, raising animals "without a soil" is out of the question. This connection with the soil implies at the same time that the animals have access to large open areas and thus to behavioural comfort and minimum stress conditions. This animal science sector is a basic component of the ecological agricultural business because it provides the organic fertilisers necessary in fertilising plants.

Key words: ecological agriculture, environment, agricultural businesses, organic fertiliser.

1. The analysis of the results obtained by the agricultural businesses that used organic fertilisers

Of the analysed agricultural businesses, about 20% used ecological technologies, while about 80% targeted only certain links in the ecological technologies (Table 1).

Table 1

**The number of agricultural businesses that used ecological production methods,
according to their legal status and agricultural sectors**

The agricultural businesses' legal status	No. o agricultural businesses using ecological production methods		
	In the vegetal sector	In the animal sector	
		Total	Partial
Individual agricultural businesses	1437	103	6503
Legal entities:	34	1	14
-agricultural enterprises/associations	5	-	-
-trading companies with majority private capital	25	1	13
-trading companies with majority state capital	1	-	-
-public administration units	1	-	-
-cooperative units	-	-	-
-other types	2	-	1
Total	1471	104	6517

(Data processed from the National Institute of Statistics, Bucharest, 2005)

The analysis refers to the agricultural businesses in Romania that used organic fertilisers according to types of fertilisers, to the agricultural businesses' legal status and the size categories of the agricultural area being used (tables 2 - 7).

Table 2

The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

Agricultural businesses' legal status	Organic fertilisers								
	Solid			Liquid			Mixed		
Size category of the agricultural area being used	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)
INDIVIDUAL AGRICULTURAL BUSINESSES									
Size categories of the agricultural area being used (ha)									
Below 0.1	20878	57391	1116.00	-	-	-	1167	1919	58.32
0.1-0.3	44093	224291	6561.21	45	655	3.93	2727	7860	300.87
0.3-0.5	35906	213970	8490.33	16	111	4.60	2381	9638	599.02
0.5-1	110210	812335	40573.09	90	1847	30.90	5812	39853	2067.04
1-2	202878	2398110	118898.99	400	1492	407.75	11363	93568	7168.93
2-5	325097	6648452	299539.61	661	2323	466.80	19541	426185	23143.72
5-10	108705	3140469	153271.35	556	11778	626.65	5638	117701	8679.76
10-20	26295	1322549	56721.58	167	5757	376.74	1176	39703	2871.32
20-30	3999	297272	10941.10	29	440	49.30	175	10315	742.09
30-50	2031	200117	8971.01	21	1569	167.15	98	21793	909.68
50-100	1188	128381	8672.93	8	273	79.80	50	13543	644.90
Over 100	586	111925	11142.47	11	924	1027.81	34	16825	1775.14
Total	**881866**	**15555262**	**724899.67**	**2004**	**27169**	**3241.43**	**50162**	**798903**	**48960.79**

(Data processed from the National Institute of Statistics, Bucharest, 2005)

From the analysis of the way in which chemical fertilisers are used according to the type of fertilisers, the legal status and size of the agricultural businesses, it results that 36.9% of the individual businesses having an area between 2 and 5 hectares most often use solid organic fertilisers and 33% liquid fertilisers. The same businesses use most often mixed organic fertilisers, representing 38.9% of the total number of individual agricultural businesses. It is important to notice that agricultural businesses with an area larger than 100 hectares use the organic fertiliser system to a smaller extent. The average quantity of organic fertilisers per area unit is of 21.5 tones/ha solid fertilisers, 8.4 t/ha liquid fertilisers and 15.9 t/ha mixed fertilisers.

The legal entities that represent the largest percentage in terms of organic fertilisers consumption have an area between 5-10 hectares, and the average quantity used at the level of all businesses is of 9.6 t/ha solid fertiliser, 17.0 t/ha liquid fertiliser and 6.0 t/ha mixed fertiliser (table 3).

Table 3
The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

Agricultural businesses' legal status	Organic fertilisers								
	Solid			Liquid			Mixed		
Size category of the agricultural area being used	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)
LEGAL ENTITIES									
Size categories of the agricultural area being used (ha)									
Below 0.1	10	13	0.54	-	-	-	-	-	-
0.1-0.3	34	129	5.34	-	-	-	-	-	-
0.3-0.5	27	1167	8.32	1	2	0.39	1	7	0.25
0.5-1	38	319	17.56	-	-	-	3	5	1.12
1-2	62	1024	48.89	-	-	-	4	29	2.21
2-5	175	4379	254.52	-	-	-	5	223	7.43
5-10	208	10574	492.06	4	1031	30.56	10	749	39.17
10-20	147	12151	573.94	3	52	30.50	5	438	38.40

20-30	46	36204	370.68	2	4211	14.00	5	270	80.00
30-50	65	11649	742.76	5	1494	100.20	4	242	58.80
50-100	117	37393	1997.45	6	2023	139.57	7	5286	180.50
Over 100	434	585126	67625.77	37	107770	6270.76	31	54807	8554.05
Total	**1363**	**690228**	**72137.83**	**58**	**11683**	**6585.98**	**75**	**62056**	**8961.93**

(Data processed from the National Institute of Statistics, Bucharest, 2005)

What is interesting is the status of the organic fertilisers consumption in agricultural enterprises/associations where only the economic units with an area larger than 100 hectares use liquid organic fertilisers, amounting to 4.0 t/ha and mixed ones, amounting to 0.3 t/ha.

Table 4

The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

Agricultural businesses' legal status	Organic fertilisers								
	Solid			Liquid			Mixed		
Size category of the agricultural area being used	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)
AGRICULTURAL ENTERPRISES/ASSOCIATIONS									
Size categories of the agricultural area being used (ha)									
Below 0.1	-	-	-	-	-	-	-	-	-
0.1-0.3	-	-	-	-	-	-	-	-	-
0.3-0.5	-	-	-	-	-	-	-	-	-
0.5-1	-	-	-	-	-	-	-	-	-
1-2	-	-	-	-	-	-	-	-	-
2-5	2	55	2.00	-	-	-	-	-	-
5-10	6	320	13.89	-	-	-	-	-	-
10-20	7	2018	49.50	-	-	-	-	-	-
20-30	1	400	14.00	-	-	-	-	-	-
30-50	3	210	48.00	-	-	-	-	-	-
50-100	15	2368	174.00	-	-	-	-	-	-
Over 100	80	73637	6657.68	7	8547	2059.34	2	145	472.00
Total	**114**	**79008**	**6959.07**	**7**	**8547**	**2059.34**	**2**	**145**	**472.00**

(Data processed from the National Institute of Statistics, Bucharest, 2005)

In conclusion, agricultural businesses that most often use organic fertilisers are individual agricultural businesses. That is why they use the manure from their own animal micro-farms.

If the consumption percentage in individual businesses decreases towards the area of 100 hectares, it increases significantly in agricultural enterprises and associations.

The type of capital ownership significantly influences the degree of using organic fertilisers.

If the trading companies with private capital that use solid organic fertilisers amount to 417 businesses, the public administration units amount to 215 and the trading companies with majority state capital to 14 businesses. The agricultural businesses operating as trading companies use an average quantity of 11.6 t/ha solid organic fertilisers, 24.1 t/ha liquid organic fertilisers and 8.2 t/ha mixed fertilisers. Most companies that use organic fertilisers have an area of over 100 ha (table 5).

Table 5

The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

Agricultural businesses' legal status	Organic fertilisers								
	Solid			Liquid			Mixed		
Size category of the agricultural area being used	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)
TRADING COMPANIES WITH MAJORITY PRIVATE CAPITAL									
Size categories of the agricultural area being used (ha)									
Below 0.1	2	3	0.18	-	-	-	-	-	-
0.1-0.3	5	12	0.78	-	-	-	-	-	-
0.3-0.5	5	1035	1.66	1	2	0.39	-	-	-
0.5-1	5	50	2.39	-	-	-	1	1	0.60
1-2	8	222	6.20	-	-	-	-	-	-
2-5	26	1351	61.63	-	-	-	-	-	-
5-10	18	1487	65.44	2	986	18.52	1	100	5.00
10-20	25	3534	142.59	2	47	30.00	2	18	30.00
20-30	20	22936	202.47	2	4211	14.00	3	255	64.50
30-50	24	6546	335.24	3	1245	45.20	2	115	53.60
50-100	72	22269	1310.81	6	2023	139.57	2	16	110.00
Over 100	207	352271	33433.25	28	95623	4073.42	21	41271	4796.22
Total	**417**	**411716**	**35562.64**	**44**	**104137**	**4321.10**	**32**	**41776**	**5059.92**

(Data processed from the National Institute of Statistics, Bucharest, 2005)

The number of trading companies with majority state capital that use organic fertilisers has decreased in the past few years but it is significant that only 17 of them fertilise agricultural areas with organic fertilisers, 14 units with 13.9 t/ha solid fertiliser, 1 unit with 1.4 t/ha liquid fertiliser and 2 units with 3.53 t/ha mixed fertiliser (table 6).

Table 6

The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

| Agricultural businesses' legal status | Organic fertilisers | | | | | | | | |
| Size category of the agricultural area being used | Solid | | | Liquid | | | Mixed | | |
	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)
TRADING COMPANIES WITH MAJORITY STATE CAPITAL									
Size categories of the agricultural area being used (ha)									
Below 0.1	-	-	-	-	-	-	-	-	-
0.1-0.3	2	5	0.35	-	-	-	-	-	-
0.3-0.5	2	8	0.60	-	-	-	-	-	-
0.5-1	-	-	-	-	-	-	-	-	-
1-2	2	110	1.89	-	-	-	-	-	-
2-5	-	-	-	-	-	-	-	-	-
5-10	-	-	-	-	-	-	-	-	-
10-20	1	60	2.00	-	-	-	-	-	-
20-30	-	-	-	-	-	-	-	-	-
30-50	2	227	16.70	1	49	35.00	-	-	-
50-100	-	-	-	-	-	-	1	100	3.50
Over 100	5	1307	101.50	-	-	-	1	8560	243.00
Total	**14**	**1717**	**123.04**	**1**	**49**	**35.00**	**2**	**8660**	**246.50**

(Data processed from the National Institute of Statistics, Bucharest, 2005)

The same source (NIS) indicates that Romania's level of 228 public administration units agrees with organic fertilisation, of which 215 fertilise with solid fertiliser, 2 with liquid fertiliser and 11 with mixed fertiliser. Most units that use organic fertiliser have areas larger than 100 hectares and use an average quantity of 5.2 t/ha solid organic fertiliser, 26.1 t/ha liquid fertiliser and 3.2 t/ha mixed fertiliser (table 7).

In conclusion, the economic and administrative situation of the previously analysed units allows for a reduced use of organic fertilisers in comparison with agricultural enterprises and individual agricultural businesses.

Table 7

The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

Agricultural businesses' legal status	Organic fertilisers								
	Solid			Liquid			Mixed		
Size category of the agricultural	Agricultural businesse	Applied quantity (tons)	Area on which they were	Agricultural businesse	Applied quantity (tons)	Area on which they were	Agricultural businesse	Applied quantity (tons)	Area on which they were

area being used	s (no.)		applied (ha)	s (no.)		applied (ha)	s (no.)		applied (ha)
PUBLIC ADMINISTRATION UNITS									
Size categories of the agricultural area being used (ha)									
Below 0.1	3	3	0.12	-	-	-	-	-	-
0.1-0.3	7	434	1.16	-	-	-	-	-	-
0.3-0.5	6	40	1.94	-	-	-	-	-	-
0.5-1	8	41	4.36	-	-	-	1	2	0.02
1-2	8	99	5.88	-	-	-	-	-	-
2-5	15	191	19.93	-	-	-	1	5	3.00
5-10	10	480	35.58	-	-	-	-	-	-
10-20	11	779	55.92	-	-	-	-	-	-
20-30	9	1599	88.57	-	-	-	1	10	15.00
30-50	13	1447	93.14	-	-	-	-	-	-
50-100	11	1379	251.00	-	-	-	1	5000	50.00
Over 100	114	132663	25451.82	2	3600	138.00	7	4831	3042.83
Total	**215**	**138755**	**26009.42**	**2**	**3600**	**138.00**	**11**	**9848**	**3110.85**

(Data processed from the National Institute of Statistics, Bucharest, 2005)

Cooperatives use organic fertilisers most rarely out of the total number of agricultural businesses. These fertilise the areas they have neither with liquid nor with mixed fertilisers, and only 5 of them use solid organic fertiliser on an area of 38.4 hectares (table 8).

Table 8

The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

Agricultural businesses' legal status	Organic fertilisers								
	Solid			Liquid			Mixed		
Size category of the agricultural area being used	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)
COOPERATIVE UNITS									
Size categories of the agricultural area being used (ha)									
Below 0.1	-	-	-	-	-	-	-	-	-
0.1-0.3	2	6	0.35	-	-	-	-	-	-
0.3-0.5	-	-	-	-	-	-	-	-	-
0.5-1	-	-	-	-	-	-	-	-	-
1-2	-	-	-	-	-	-	-	-	-
2-5	1	5	0.10	-	-	-	-	-	-
5-10	-	-	-	-	-	-	-	-	-
10-20	1	6	2.00	-	-	-	-	-	-
20-30	-	-	-	-	-	-	-	-	-
30-50	-	-	-	-	-	-	-	-	-
50-100	1	7800	36.00	-	-	-	-	-	-
Over 100	-	-	-	-	-	-	-	-	-
Total	**5**	**7817**	**38.45**	**-**	**-**	**-**	**-**	**-**	**-**

(Data processed from the National Institute of Statistics, Bucharest, 2005)

The status of other types of agricultural businesses is significantly similar to that of individual agricultural businesses, only the main size class in terms of

area, which has the majority percentage, falls in the interval 5-10 hectares for all the types of organic fertilisation. The businesses that use solid fertilisers amount to 598 units, and those that use liquid organic fertilisers are represented by 4 units, and those that fertilise the agricultural area with mixed fertilisers amount to 24 units (table 9).

Table 9

The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

Agricultural businesses' legal status	Organic fertilisers								
	Solid			Liquid			Mixed		
Size category of the agricultural area being used	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)
OTHER TYPES OF AGRICULTURAL BUSINESSES									
Size categories of the agricultural area being used (ha)									
Below 0.1	5	7	0.24	-	-	-	-	-	-
0.1-0.3	18	72	2.70	-	-	-	-	-	-
0.3-0.5	14	84	4.12	-	-	-	1	7	0.25
0.5-1	25	228	10.81	-	-	-	1	2	0.50
1-2	44	593	34.92	-	-	-	4	29	2.21
2-5	131	2777	170.86	-	-	-	4	218	4.43
5-10	174	8287	377.15	2	45	12.04	9	649	34.17
10-20	102	5754	321.93	1	5	0.50	3	420	8.40
20-30	16	1369	65.64	-	-	-	1	5	0.50
30-50	23	3219	249.68	1	200	20.00	2	127	5.20
50-100	18	3577	225.64	-	-	-	3	170	17.00
Over 100	28	25248	1981.52	-	-	-	-	-	-
Total	**598**	**51215**	**3445.21**	**4**	**250**	**32.54**	**28**	**1627**	**72.66**

(Data processed from the National Institute of Statistics, Bucharest, 2005)

The global analysis of the degree of using fertilisers focuses on the units with an area ranging between 2-5 hectares (about 325,000 businesses).

The businesses that most often use liquid organic fertilisers have an area ranging between 5-10 hectares (560 units) and those that use mixed fertilisers have a are between 2 an 5 hectares (19,546 units), (table 10).

In conclusion, about 935,000 agricultural businesses opted for organic fertilisers, with an increasing percentage up to an area of 5 hectares and a decreasing one from this area on.

Table 10

The agricultural businesses that used organic fertilisers, according to types of fertilisers, to the agricultural businesses' legal status and the size category of the agricultural area being used

Agricultural businesses' legal status	Organic fertilisers								
	Solid			Liquid			Mixed		
Size category of the agricultural area being used	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)	Agricultural businesses (no.)	Applied quantity (tons)	Area on which they were applied (ha)
TOTAL AGRICULTURAL BUSINESSES									
Size categories of the agricultural area being used (ha)									
Below 0.1	20888	57404	1116.54	-	-	-	1167	1919	58.32
0.1-0.3	44127	224420	6566.55	45	655	3.93	2727	7860	300.87
0.3-0.5	35933	215137	8498.65	17	113	4.99	2382	9645	599.27
0.5-1	110248	812654	40590.65	90	1847	30.90	5815	39858	2068.16
1-2	202940	2399134	118947.88	400	1492	407.75	11367	93597	7171.14
2-5	325272	665831	299794.13	661	2323	466.80	19546	426408	23151.15
5-10	108913	3151043	153763.41	560	12809	657.21	5648	118450	8718.93
10-20	26442	1334700	57295.52	170	5809	407.24	1181	40141	2909.72
20-30	4045	323576	11311.78	31	4651	63.30	180	10585	822.09
30-50	2096	211766	9713.77	26	3063	267.35	102	22035	968.48
50-100	1305	165774	10670.38	14	2296	219.37	57	18829	825.40
Over 100	1020	697051	78768.24	48	108694	7298.57	65	71632	10329.19
Total	883229	16245490	797037.50	2062	143752	9827.41	50237	860959	57922.72

(Data processed from the National Institute of Statistics, Bucharest, 2005)

At national level, about 16 m tones of solid organic fertilisers are used, 144,000 tones of liquid fertilisers and 861,000 tones of mixed fertilisers. The total area fertilised with organic fertilisers was, in 2005, of about 865,000 hectares, 92% of which with solid organic fertilisers, 1% with liquid fertilisers and 7% with mixed fertilisers.

This situation is determined by the fact that most small businesses use the manure obtained within their own animal micro-farms in fertilising the agricultural areas they have.

CONCLUSIONS

The organisation and development of the ecological production system are based on several principles which target the protection an stimulation of life in the soil, feeding the soil and using organic matter, eliminating chemicals, etc.

The ecological farms production is influenced by three categories of factors: ecological, biological and economic-social ones.

The organisation of the ecological production of animal origin must take into account respecting certain conditions related to technology, but also to ensuing profitability.

A fundamental principle in supporting animal science is that ecological agriculture cannot exist without animal science, because animals bring in the organic waste absolutely necessary in fertilising the soil and in renewing the nutritive principles exported in the vegetal production.

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RESEARCH REGARDING THE MORPHO-PRODUCTIVE PARAMETERS TO THE CARPATHINE GOAT BREED FROM SLOBOZIA-IALOMIŢA AREA

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ABSTRACT

In Romania, goats are breeding separately or together with sheep and their numeric repartition is different to a district at another according to relief, nutrition resources and tradition. Unfortunately, the goats products are produced only for selfconsumption and the herds kept by the breeders are very small (1-9 heads/unit for about 95% of total goat exploitations).

The aim of this paper is to study the morpho-productive parameters of a population which belong to Carpathine breed, raised in the small private unities from Slobozia-Ialomiţa area.

Key words: body weight, colour, body conformation, milk production.

1. MATERIALS AND METHODS

The research has take in study 25 adult females and 5 adult males from Carpathine breed. The objectives of this research were: the colour features, body conformation, the adult body weight, the evolution of quantitative and qualitative milk production and the reproduction parameters. For the obtained data were calculated the main statistics parameters.

2. RESULTS AND DISCUSSIONS

Colour features. If generally at Carpathine breed grey colour is prevalent succeded by reddish, white, black and different mottleds, at analyzed population (table 1), white colour is prevalent (46.66% from total animals), followed by the grey colour and then reddish and mottled colours (white+reddish or white+black). Is to point out that we don't met the black colour.

Body conformation. For to study the body conformation we have maked eight body measures on the adult animals.

Table 1

The main colours met at analyzed population

SPECIFICATION	WHITE COLOUR	GREY COLOUR	REDDISH COLOUR	MOTTLED WHITE+REDDISH	MOTTLED WHITE+BLACK	TOTAL
Heads number	14	9	3	3	1	30
Percent from total (%)	46.66	30.00	10.00	10.00	3.33	100

The results of this determination are showed in table 2, where we maked a comparision between the average values of our population and those of Carpathine standard breed and other Carpathine breed ecotype.

Table 2

Comparative data upon the main body dimensions (average values)
- cm -

SPECIFICATION	CARPATHINE BREED	MIZIL-PRAHOVA ECOTYPE	SLOBOZIA ECOTYPE
The stature	63.16	62.30	61.53
The croup height	65.92	65.38	63.69
The trunk length	66.60	65.88	67.15
The profundity of thorax	29.50	29.51	28.95
The chest width	17.28	17.60	17.19
The croup width	15.12	15.40	14.94
The thorax perimeter	80.92	82.50	80.46
The whistle perimeter	8.06	7.92	7.64

From these data we can see that generally the values of body conformation at the analyzed population are smaller than those of Carpathine standard breed and smaller also than those of Mizil-Prahova ecotype, with the trunk length exception. So, we can say that from this point of vue the Slobozia ecotype has a worst body conformation beeing through the inferior populations of Carpathine breed.

Body weight. Was performed by weighing the animals in their adult stage (table 3).

Table 3

The body weight in adult stage (kilos)

SPECIFICATION	N	X±SX	LIMITS	CV%
Females	25	40.36 ± 0.81	32.6 - 50.2	14.76
Males	5	48.34 ± 0.74	40.3 – 55.4	15.41

From table 3, we can see that in the adult stage the average body weight was 40.36 kilos, with limits between 32.6 and 50.2 kilos at females and respectively 48.34 kilos with limits 40.3 and 55.4 kilos at males. We can see also (table 4), that the obtained values for our population are smaller than those of Câmpina and Zlatna–Alba ecotype ecotypes, and higher than those of Hateg and Mizil ecotypes.

Table 4

The adult stage body weight at different populations of Carpathine breed

THE GEOGRAPHIC AREA	FEMALES	MALES
CÂMPINA	52.50 ± 0.61	56.70 ± 1.20
MIZIL	40.00 ± 0.20	-
HATEG	38.50 ± 0.16	-
ZLATNA-ALBA	41.80 ± 0.82	-
SLOBOZIA	40.36 ± 0.81	48.34 ± 0.74

Milk production The study of quantitative milk production was performed by the classic method of check, respectively was used the twice a month checking coefficient method by milking the goats in the morning and the evening of the check day, being carried aut 14 ckeckings from March to September 2006. The obtained values after the end of check are showed in table 5. The average milk production was 289.8 liters, which is higher with about 28% by one quotabled in the speciality literature (V. Tafta, 2002).

Table 5

The quantitative and qualitative milk production

Specification	X±SX	LIMITS	CV%
Quantitative milk production (liters)	289.8 ± 7.47	156,8 – 468,6	18,67
Dry matter (%)	13.86 ± 0.06	12.56 – 14.68	4.28
Milk Fat (%)	4.12 ± 0.06	3.6 – 5.8	7.82
Protein content (%)	3.67 ± 0.04	3.3 – 4.8	5.61

From analysis of the individual milk production, we can observe that it has a large variability (with limits between 156 and 468 liters) due to the absence of selection and the different feeding conditions. The qualitative milk production is good, especially in the fat content and also in protein, which raise the conversion efficiency of milk in cheese. The mean length of lactation in checked goats was $208 ± 2,15$ days, which is smaller comparative with standard Carpathine breed.

Reproduction indexes. The fecundity was 100% and the prolificacy by 157 %, being closely to the superior limit of literature data. Reported at the total number of females, we obtained 47 kids, respectively were 56.6% simple births, 33.3% double births, 6.6 triple births and 3.3% quadruple births (table 6).

Table 6

The lambing distribution

Specification	Simple births	Double births	Triple births	Quadruple births	Total
Goat number (heads)	9	12	3	1	25
% from total	36	48	12	4	100

3. CONCLUSIONS

1. Generally the values of body conformation at the analyzed population are smaller than those of Carpathine standard breed and also smaller than other ecotype (Mizil-Prahova), with the trunk length exception. The body weight in adult stage at the analyzed population is smaller than those of Câmpina and Zlatna–Alba ecotype ecotypes, and higher than those of Hateg and Mizil. So, we can say that from this point of vue the Slobozia ecotype has a inadequate body conformation beeing through the inferior populations of Carpathine breed.

2. The average milk production is about 289.8 liters, which represent a good production comparative with those of other populations of the same breed, being higher than that in speciality papers with about 28%. On the contrary, the length of lactation is not so good (208 days) and concerning the milk quality, the obtained results show the superior nourishing value of the producing milk, that lead to the increasing of the dairy products efficiency.

3. From 25 females we obtained 46 kids, which it makes that the prolificacy value reach to 184%. Reported at the total number of females, we obtained 36% simple births, 48% double births, 12% triple births and 4% quadruple births.

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THE EVOLUTION OF LIVESTOCK, MILK AND GOAT CHEESE PRODUCTION IN THE EUROPEAN COUNTRIES

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ABSTRACT
In the Romanian agriculture the goat breeding can became an important economic domain of animal breeding, especially in the hills and mountain areas, with the condition of improvement of their productivity through selection and crossbreeding with specialization breeds. The aim of this paper is to make an analyze of goat breeding domain in Europe, especially regarding the livestock situation, milk and cheese production between 1995-2006 period. Unfortunately, the analyze show that for Romania does not exist data regarding the milk and cheese production, being data only for livestock situation. It is absolutely necessary to find a way for a better cognition of goat breeding domain in Romania and on the basis of this approach, to find the suitable breeding systems like in the European developed countries.

Key words: goats, livestock, milk production, cheese

1. MATERIALS AND METHODS

The aim of this paper was to make an analyze of the european goat domain that is livestock, milk and cheese production, between 1995-2006 period. We study the FAO statistical databases and for each table and dates we calculated the percent differences between the referential years.

2. RESULTS AND DISCUSSIONS

In the Europe and particularly in countries with a developing dairy industry the goat milk is processed into a variety of products for immediate consumption or for later use during times of reduced milk production. In many countries there exist several traditional milk products whose processing techniques and technologies are handed down from generation to generation through demonstration and experience.

The evolution of goat livestock in the world is presented in table 1. As we can see from table 1 the goat livestock in the world was estimated by FAO in 2006 at 837,235 thousand heads. Over the past ten years the goat livestock increase with about 26.6%, with an annual increase rate of 2.4%. As shown in table 1, the European continent ranks fifth in goat livestock, and we can observe

also here that the goat livestock was in a continuos decresing over the past ten years with a ratio of about 11.11%.

The evolution of goat livestock in Europe is presented in table 2. As we can see from table 1 the goat livestock in Europe was estimated by FAO in 2006 at 17,768 thousand heads.

As shown in table 2, the greatest goat livestock are situated in the succesive countries: Greece, Spain, Rusian Federation, France and Italy.

Table 1

Goat livestock evolution in the world between 1995-2006 (after site FAO, 2008)

Goat Livestock *-heads-*	Year			Differences 2006/1995 (±%)
	1995	**2000**	**2006**	
World	661,277,742	724,560,200	837,235,801	+26.60
Africa	191,370,743	213,719,102	242,830,528	+26.89
Asia	412,866,004	456,376,553	534,826,668	+29.54
Europe	19,989,473	18,890,096	17,768,910	-11.11
North & Central America	12,172,113	11,204,260	11,929,704	-1.99
Oceania	773,199	751,231	940,971	+21.69
South America	24,106,210	23,618,958	28,939,020	+20.05
European Union	14,206,645	14,443,622	13,625,629	-4.09
Developed Countries	22,383,973	21,698,236	21,286,701	-4.90
Developing Countries	638,893,769	702,861,964	815,949,100	+27.71

Over the past ten years the goat livestock increased in most of the european countries with a ratio between 0.71% (Greece) and 307.89% (Netherlands), and in other countries the goat livestock was in a continuos decresing like in Albania, Czech Republic, Italy, Portugal, Spain, etc.

In Romania, goats are breeding separately or together with sheep and their numeric repartition is different to a district at another according to relief, nutrition resources and tradition. Unfortunately, the goats products are produced only for selfconsumption and the herds kept by the breeders are very small (1-9 heads/unit for about 95% of total goat exploitations). The goat livestock in Romania was in decresing in the past eleven years, but in a slowly increasing in the past 6 years.

As shown in table 3, the greatest goat milk yield production countries are Czech Republic, Austria, France, Germany, Hungary, Malta, Portugal, Norway, Switzerland and Spain, according with the level of breed selection.

There are also many countries where the goat milk yield production diminished, such as Austria, Bulgaria, Latvia, Slovakia, Spain or countries where it remained relatively stationary (Greece, Portugal).

Table 2

Goat livestock evolution in Europe between 1995-2006 (after site FAO, 2008)

Goat Livestock -heads-	Year			Differences 2006/1995 (±%)
	1995	**2000**	**2006**	
Albania	1,650,000	1,104,000	940,000	-43.03
Austria	49,749	72,254	55,100	+10.75
Belarus	54,000	58,300	67,600	+25.18
Belgium	0*	16,248	26,209	+61.31
Bosnia and Herzegovina	0*	0*	73,474	-
Bulgaria	795,436	1,046,286	608,426	-23.51
Croatia	107,292	79,391	102,877	-4.11
Czech Republic	44,993	31,988	14,402	-67.99
Estonia	0*	2,700	2,800	+3.7
Finland	4,500	8,564	6,670	+48.22
France	1,069,000	1,210,517	1,227,819	+14.85
Germany	95,000	135,000	170,000	+78.95
Greece	5,379,000	5,614,453	5,417,243	+0.71
Hungary	52,281	189,000	80,000	+53.02
Iceland	350	416	433	+23.71
Italy	1,447,600	1,397,000	945,000	-34.72
Latvia	7,400	8,100	14,900	+101.35
Lithuania	12,400	24,700	21,984	+77.29
Liechtenstein	280	280	280	-
Luxembourg	0*	1,000	1,950	+95.00
Malta	9,183	5,000	6,272	-31.40
Moldova, Republic of	96,006	99,815	119,372	+24.34
Netherlands	76,000	179,000	310,000	+307.89
Norway	61,900	76,373	72,468	+17.07
Poland	0*	0*	130,369	-
Portugal	721,000	630,000	551,310	-23.53
Romania	745,100	558,000	687,000	-7.79
Russian Federation	2,722,400	2,147,500	2,138,202	-21.46
Serbia and Montenegro	333,000	241,000	**138,604	-
Slovakia	25,135	50,905	39,566	+57.41
Slovenia	10,668	14,643	25,480	+138.84
Spain	3,157,000	2,627,000	2,834,900	-10.20
Switzerland	52,200	62,499	76,900	+47.32
Ukraine	782,000	825,200	758,000	-3.07
United Kingdom	89,600	77,164	96,000	+7.14

*no data available; ** only Serbia livestock

The total world milk production in 2006 was estimated by FAO at 653,789 thousand tons. Normally, cow milk production has the greatest percentage (84.08%), being followed by buffalo milk production (table 4). Goat milk production ranks third in the world and also in Europe, having just 2.11% of the total milk, and 1.15%, respectively.

Table 3

Goat milk yield evolution in Europe between 1995-2006 (after site FAO, 2008)

Goat Milk Yield *-litres/head-*	Year			**Differences** **2006/1995** **(±%)**
	1995	**2000**	**2006**	
Albania	83	88	101	+21.68
Austria	792	419	446	-43.68
Bulgaria	224	224	176	-21.43
Czech Republic	540	519	722	+33.70
Estonia	0*	319	355	+11.28
France	479	575	692	+44.47
Germany	578	578	972	+68.17
Greece	123	135	119	-3.25
Hungary	344	361	455	+32.26
Italy	127	98	145	+14.17
Latvia	1085	445	376	-65.34
Lithuania	859	615	371	-56.81
Malta	360	400	492	+36.66
Moldova, Republic of	39	59	132	+238.46
Norway	427	431	475	+11.24
Portugal	553	533	528	-4.52
Russian Federation	250	305	249	-0.40
Slovakia	431	364	247	-42.69
Spain	552	541	335	-39.31
Switzerland	480	556	636	+32.50
Ukraine	378	408	396	+4.76

*no data available

Table 4

The main types of milk in the world and Europe in 2006 (after site FAO, 2008)

-thousand tons-

Specification	Total milk	Cow milk	Buffalo milk	Goat milk	Sheep milk	Camel milk
World milk production	653,789	549,693	80,094	13,801	8,723	1,479
Percentage (%)	100	84.08	12.25	2.11	1.33	0.23
European milk production	215,105	209,441	222	2,479	2.963	-
Percentage (%)	100	97.37	0.10	1.15	1.38	-

At the world level, goat milk production has registered an increase of about 17.52% over the past ten years, which means an annual increase rate of 1.59% (table 5). As shown in table 5, the European continent ranks third in goat milk production, with a ratio of about 12.32%, after Asia (11.28%) and Africa (21.20%), according with the goats stocks.

Table 5

The evolution of goat milk in the world between 1995-2006 (after site FAO, 2008)

Goat Milk Production (Mt)	Year			Differences 2006/1995 (±%)
	1995	**2000**	**2006**	
World	11,743,162	11,656,294	13,800,845	+17.52
Africa	2,581,405	2,687,790	3,128,588	+21.20
Asia	6,611,864	6,124,845	7,820,775	+11.28
Europe	2,207,057	2,496,810	2,479,038	+12.32
North & Central America	159,299	156,152	164,338	+3.16
Oceania	26	28	30	+15.38
South America	183,510	190,669	208,076	+13.38
European Union	1,485,807	1,629,211	1,827,807	+23.00
Developed Countries	2,326,108	2,614,056	2,479,038	+6.57
Developing Countries	9,417,053	9,042,238	11,321,807	+20.23

However, although the goat stocks are about 30 times bigger in Asia than in Europe, milk production in Europe is about 3 times smaller than in Asia. This comparison shows that, in Asia, the productive performance of the breeds are generally low, while those from Europe have a good milk production, and also adequate feeding and maintenance conditions.

This conclusion is better emphasized if we compare the increasing rate of goat milk production between the developing and the developed countries. In table 6, we can observe the evolution of goat milk production in the European countries.

As shown in table 6, the greatest goat milk production countries are France, Greece and Spain, according to the goats stocks. The total world cheese production in 2005 was estimated by FAO at 18.5 mil. tons (table 7). Normally, the cheese from the cow milk production has the greatest percentage (92.3%), being followed by the cheese from sheep milk production (3.6%).

Goat cheese production ranks third in the world and also in Europe, having just 2.37% from the total cheese production, and 1.99%, respectively.

At the world level, goat cheese production has registered an increase of about 5.4% in the past ten years, which means an annual increase rate of 0.54% (table 8). As shown in table 8, the European continent ranks first in the goat cheese production with a ratio of about 45%, followed by Africa (28.1%) and Asia (22.8%), according to the consumers' demands.

The demand for cheese goat products in Europe continues to increase, and the growth in demand results from the rapidly growing populations, urbanisation, and some increase in the income per capita.

Table 6

Goat milk evolution in Europe between 1995-2006 (after site FAO, 2008)

Goat Milk Production (Mt)	Year			Differences
	1995	**2000**	**2006**	**2006/1995 (±%)**
Albania	95,500	71,000	71,000	-25.65
Austria	13,741	16,782	13,405	-2.44
Bulgaria	147,147	190,200	102,297	-30.49
Czech Republic	15,656	14,554	5,727	-63.42
Estonia	0*	702	568	-19.08
France	431,700	484,517	583,197	+35.01
Germany	22,000	22,000	35,000	+59.01
Greece	512,975	520,433	511,373	-0.31
Hungary	9,980	10,839	4,552	-54.39
Italy	137,000	112,800	49,479	-63.88
Latvia	3,800	1,983	2,939	-22.65
Malta	1,800	1,600	1,311	-27.17
Moldova, Republic of	2,967	4,580	12,227	+312.09
Norway	25,100	21,700	21,194	-15.56
Portugal	42,591	34,138	20,394	-52.12
Russian Federation	206,700	316,541	256,000	+23.85
Slovakia	7,600	13,200	8,900	+17.11
Spain	325,800	438,541	423,383	+29.95
Switzerland	16,000	16,500	21,000	+31.25
Ukraine	189,000	204,200	258,000	+36.51

*no data available

Table 7

The main types of cheese in the world and Europe in 2005 (after site FAO, 2008)

Specification	Total cheese	Cheese (whole cow milk)	Cheese (skim cow milk)	Buffalo milk cheese	Sheep milk cheese	Goat milk cheese	Whey cheese
World Production (Mt)	18,482,995	14,898,073	2,161,902	264,080	666,178	437,795	54,967
Percentage (%)	100	80.60	11.70	1.43	3.60	2.37	0.30
European Production (Mt)	9,921,168	8,199,490	1,076,672	14,330	380,117	197,054	53,505
Percentage (%)	100	82.65	10.85	0.14	3.83	1.99	0.54

Table 8

Evolution of goat cheese production in the world, 1995-2005 (after site FAO, 2008)

Cheese of Goat Milk Production (Mt)	Year			Differences 2005/1995 (±%)
	1995	**2000**	**2005**	
World	415,451	411,719	437,795	+5.4
Africa	137,877	122,010	122,950	-10.8
Asia	97,169	87,960	99,814	+2.7
Europe	163,116	184,064	197,054	+20.8
North & Central America	13,360	13,694	13,861	+3.8
South America	3,928	3,991	4,115	+4.7
European Union	137,825	156,707	184,554	+33.9
Developed Countries	173,716	193,854	215,994	+24.3
Developing Countries	241,734	217,865	221,801	-8.2

This increasing demand (20.8% in the last ten years in Europe) affords great opportunity and potential for the smallholder milk producer and for the development of the milk production and processing industry.

Table 9

Evolution of goat cheese production in Europe, 1995-2005 (after site FAO, 2008)

Cheese of Goat Milk Production (Mt)	Year			Differences 2005/1995 (±%)
	1995	**2000**	**2005**	
Albania	700	1,050	1,050	+50.0
Austria	1,050	1,275	1,200	+14.3
Bulgaria	12,300	12,900	6,000	-51.2
Czech Republic	1,174	1,092	769	-34.5
France	54,000	59,930	80,500	+49.1
Germany	1,800	1,500	2,100	+16.6
Greece	48,000	48,000	48,000	0
Hungary	1,287	1,398	1,419	+10.2
Italy	7,200	8,580	8,900	+23.6
Malta	17	7	7	-58.8
Norway	1,250	1,200	1,200	-4.0
Portugal	1,775	1,422	1,200	-32.4
Slovakia	563	960	960	+70.5
Spain	24,000	36,000	37,500	+56.2
Ukraine	8,000	8,750	6,250	-21.8

Goat cheese is made in almost every country of the Europe. Despite the large number of cheese varieties, goat cheeses may be classified into different groups, i.e. ripened and unripened cheese, cheese with low or high fat contents, and cheese with soft or hard consistency.

Goat cheese is mainly produced in the Balkan countries and in the southern EU countries (France, Italy, Spain, Portugal, Greece) according with

the goats stocks. Certainly, there are many other countries in Europe where goat cheese is produced, such as Poland, Hungary, Norway, etc.

Usually, we can distinguish the following six types: fresh cheese, soft paste cheese (with in bloom or washed crust), semi-hard cheese ripened in brine, whey cheese, pressed uncooked paste cheese, and blue cheese. In general, the production of traditional goat cheese has the following succession phases: milk filtration, milk maturing, milk heating, milk coagulation, curd cutting, moulding, draining, salting, drying, and aging.

As shown in table 9, the greatest goat cheese production European countries are France, Greece and Spain, according to the goats stocks and their goat milk production. If we analyze the evolution of goat cheese production in the last ten years, we can observe that Slovakia registered an increase of about 70.5%, followed by Spain (56.2%), and Albania (50%). There are also many countries where the goat cheese production diminished, such as Malta, Bulgaria, Czech Republic, Portugal, or countries where it remained stationary (Greece).

3. CONCLUSIONS

1. It is absolutely necessary to find a way for a better cognition of goat breeding domain in Romania and on the basis of this approach, to find the suitable breeding systems like in the European developed countries.

2. In Romania, goats are breeding separately or together with sheep and their numeric repartition is different to a district at another according to relief, nutrition resources and tradition. Unfortunately, the goats products are produced only for selfconsumption and the herds kept by the breeders are very small (1-9 heads/unit for about 95% of total goat exploitations).

3. The demand for cheese goat products in Europe continues to increase, even for those made according to the traditional techniques, and the increasing demand results from the rapidly growing populations, urbanisation, and some increase in the income per capita. In general, the consumers recognise this cheese type that is made almost manually, following old recipes, and are willing to pay more for it.

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CLIMATE CONDITIONS IN CATTLE HOUSES BUILT WITH RESPECT TO EU NORMES AND FROM CLASSICAL SHELTERS IN USE IN ROMANIA

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ABSTRACT
During the last decades many essential changes took place in the animal breeding technologies and we are referring especially to feeding, reproduction and improvement. To all these the technology development is added that lead to mechanization, automation of some production processes. In this context, our intervention is imposed for the housing construction solutions by modernizing the existing animal houses and also their design process.
We considered in our study three construction variants in order to verify the climate conditions inside the animal houses, created by different types of envelopes, capable to assure cattle livestock welfare, in free stall accommodation.
In all the cases that were studied is remarked the importance of the ventilation in assuring the comfort required by the specie.

INTRODUCTION

Cattle breeding and exploitation remains an activity of high interest for many investors in our country. During the last decades, essential changes took place in terms of breeding technologies, especially in feeding, reproduction and amelioration. The technique's development lead to mechanization and automation of the production processes meant to ease the farmers' labour. Within this context an intervention in constructive variants it's imposed for cattle housing, by modernizing the existent shelters, together with new solution for the design of new investments.

According to European trend, the application of modern technologies that assure good exploitation conditions and animal welfare, higher in come then the expenses, it's possible into a cattle breeding farm by turning to free stall system, with individual resting area or group pen on straw bedding. Animals have to have this bordering from their birth.

Material and Method

There are in use two types of construction systems for cattle housing – some warm – with four sides walls, and others cold – were a part or entire long side walls are replaced by rolling curtains, when the exterior temperature permits this solution.

The cold shelters are built and used in our country in different regions even if the external temperature during the winter is negative. These constructions prevail thru their simplicity and their price per square meter of built surface.

The open (cold) constructive system forces us to use a balanced food ratio in nutritious principles, to assure high level of forage consumption to obtain higher productions.

Several climate control measurements were carried out during 2006-2007 to verify the behaviour in exploitation of different types of cattle shelters.

The measurements took place in Bihor and Mures County, inside traditional shelters, closed by perimeter walls, or where the windows were dismantled and in half open shelters. In all the variants the dairy cows housing was in free systems where the density upon square meter of built surface was comparable.

The results, statistically processed are presented in the following tables:

Cattle breeding farm in Bihor County

Table 1

Climate parameters/ month	T_e medium (^{0}C)	T_i medium (^{0}C)	Hu_e medium (^{0}C)	Hu_i medium (%)	Air velocity (m/s)
Half open shelter					
december	+2,31	+2,87	76,98	81,50	-

Cattle breeding farm in Mures County

Trable 2

| Climate parameters/ month	T_e medium (^{0}C)	T_i medium (^{0}C)	Hu_e medium (^{0}C)	Hu_i medium (%)	Air velocity (m/s)
Closed shelters (with walls and windows)					
February	+0,4	+6,3	52	62	0
March	+10	+12	60	65	0,3
Closed shelters with dismantled windows					
February	+0,4	2,3	52	56	0,3
March	+10	+11	60	64	0,7
Half open shelter					
February	+0,4	3,1	52	52	0,5
April	+1,5	15,4	65	70	0,7

As it can be observed in the presented data, during the gentle winter from the last year, in all there types of cattle houses were registered values of temperature, humidity and air currents velocity accepted by the specie. The condensation phenomena was present both on walls and ceilings. In the closed shelters the admission holes for fresh air and the exhaustion chimneys for poison gases. This phenomena can be found in many existing shelters today.

Some observations will be made in the following paragraphs regarding the way that cattle cope with the climate conditions offered by half open shelters (solution used frequently in EU countries).

From the observation reported by several researchers (2,3) it has been observed that the cattle cope easier with low temperatures then the high ones. In order to accommodate, they increase their metabolic rate, eliminating large quantities of heat. The body hygiene is very important for their adaptation to the low temperatures. In case of wet coat or filled with impurities, the insulation is insufficient. The air between the clean hair yarns assures a perfect insulation.

The movement of cold air removes the heat from the animals' body surface and the temperature percepted by the animal is lower then the real value, as the wind or air currents velocity increases (1). At -15^0C external temperature, with no wind, the temperature percepted by the animals remains -15^0C; at 8 km/h wind velocity , the temperature perception decreases at -18^0C; at 32 km/h it arrives at -29^0C. The neutral zone of temperature it's considered between -15^0C and $+26^0$C, with optimum values between 0^0C and 20^0C.
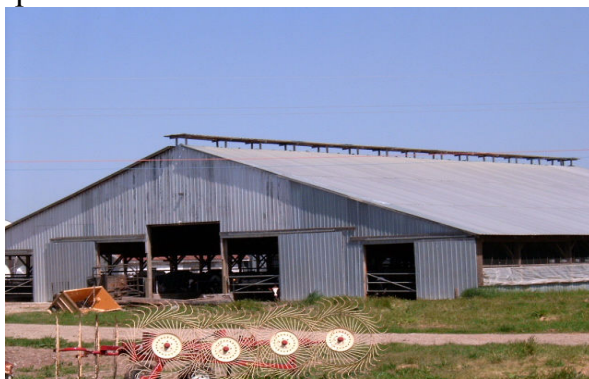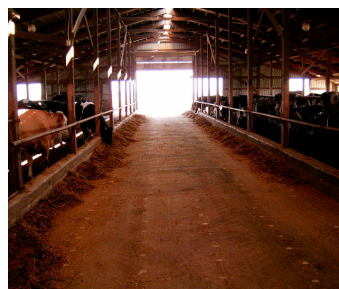

Cow shelter

Mobile curtain
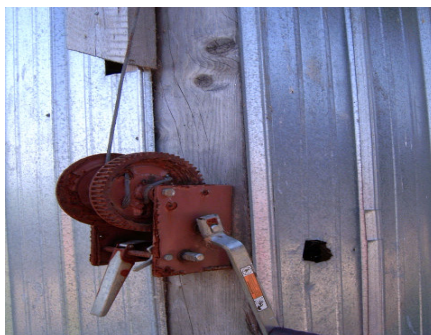
Interior view

The humidity effect depends on the temperature;; the first being underlined by low temperatures. At high temperature values combined with high humidity rates, heat stress appears.

The physiological effects of the air movements as in direct relation with temperature and humidity. High speed is benefic at high temperatures.

The mechanisms that help cattle to bear low temperature are acclimatization, fat tissue and metabolic rate (2,3).

Conclusions

All three constructive structures can be user in our country if the physical welfare conditions are respected as well as social and technological ones, and the natural organized ventilation works at the designed parameters. The shelters with no long side walls (replaced by mobile curtains fixed on whire mesh that keep birds away), ca be used also in our country but only in locations with gentle climate and no strong winds.

Performant technology practice is imposed for animals feeding forage at will. The free access to foraging, the decrease of competition between dominant and dominated individuals is assured by the quantity and quality of the forage.

Electronic programming of the access to foraging are essential conditions to obtain high productions in free stall accommodation in half open shelters; dependin on biological potential, in concordance with the physiological condition at certain moment, concomitant with milking automation and precocious spotting of sexual cycles with permanent suiveillance of health estate.

The half open shelters have lower prices and the investment recover takes relatively short time, the farmers will obtain products according to EU standards of quality and consumers will benefit of lower prices for food products.

Inside arrangements and equipment have to satisfy human and animal exigenses imposed by the exploitation system and production techniques applied for reaching the optimum yield in dairy cow farm of high performance.

The construction of large size farmes is imposed in order to realize high labour productivity, farms that assure mechanization and automation of production processes.

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AGRITOURISM – THE ROMANIAN MOUNTAIN VILLAGE'S CHANCE FOR DEVELOPMENT

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SUMMARY:
In the enlarged and united Union, Romania is becoming more and more attractive and sought after as tourism and agri-tourism destination.

The ethnographic resources have a distinct place within the rural objectives of anthropic origin, by their specificity first of all, knowing the fact that each nation has its own spiritual and material patrimony, resulted from the evolution of their conscience and the spreading of population in the area. For this, the people coming from outside an area or belonging to other ethnicity will assimilate this patrimony, which, for them, will represent the features of uniqueness and novelty.

A feature of the ethnograhic resources is the permanent joining of attrative buildings and objectives, in other words there is a symbiosis between matter and spirit.

The destiny of the ethnographic patrimony shows paradoxal situations, its minimum share being in the most industrialised and urban countries while the richest resources are in the developing countries. This is because the real popular culture is the prerogative of the rural life, with traditions preserved adn enriched by the experience of its own creators.

Among the attractive anthropic events the most important are: occupations and crafts; costumes, dances and popular songs; traditional holidays; architecture and peasant technical installations; human settlements.

Keywords: agriculture, touristic activity, mountain opportunities, agricultural turism, economic development

INTRODUCTION

The Romanian mountain area represent about a third of the national territory and it is at the same time the largest European mountain massif within the same borders.

The surface is of 79.919 km^2, out of which 53.3% is covered by forests, with a 74.4% degree of aforrestation and 42% agricultural lands, constituting 46% of the territory of 28 counties, within 729 communes, with 3960 villages and 92 mountain cities.

Population: 3614000 inhabitants (45 inhabitants/km^2), out of which 21000000 are farmers who own about 1000000 private farms, most of them being of subsistence, in which they perform a traditional agriculture, animal husbandry being the main occupation. In the rural and pre-city environment the populations' incomes come from agriculture (30-40%) and pluriactivities

(forestry, mining, processing industries, services, handicrafts and so on). The farms are the main job provider for the industrial sectors.

The agricultural products are not polluted and of high biological quality. In spite of the farms' subsistence character, the mountain area has an important potential for producing goods, especially as far as the animal products are concerned: milk, meat, leather, wool. An important aspect is the fact that these goods are obtained with minimum consumption of cereals and energy (oil and electricity). The energetic consumptions per product unit are higher but are based on recyclable energies. Another characteristic of the mountain areas is the fact that they are naturally (altitude, climate, slopes, low soil fertility, isolation) and structurally (ageing of the active population and the exodus tendencies, restrictive occupation, great distances to the decisional centers, insufficient infrastructure and so on) disadvantaged.

The main riches of the mountain areas are and must remain the following:
- forests – source of raw materials and energy
- agricultural lands – for animal breeding and production of quality food
- waters – for energy and drinkable water used by the cities
- population – especially the agricultural one, healthy and energetic, which provides decentralized colonization of the national territory and the preservation of the cultural landscape

Mountain agriculture

It is a marginalized agriculture, with low technologies and low vegetal and animal outputs. The isolation, the lack of production factors and professional and economical bodies, the lack of vocational training of farmers on the specificity of the mountain economy make the mountain area not only a disadvantaged area but also an extremely vulnerable area from the economical and social points of view – and this could lead to demographical exodus and environment degradation.

The European integration of the Romanian mountain area implies the development in specific balanced ecosystems, based on the family farms and the private property, continuing the traditions and the pluriactivity.

Decrease of the mining and other industrial activities have generated a high number of unemployed people whose properties are too small to ensure their existence.

In the Romanian mountain area where the basic structure – the family farm – exists, the shift from the centralized to the market economy cannot be done by restructuring the production units but by reorganizing the environment upstream and downstream the agricultural farms: supplying, storing and selling the products, organizing the credits and so on.

The dominant is given by the quality factor, in all fields of activity, by a balanced agri-forest concept, pluriactivity and by turning the resources into account.

A main strong point is represented by the fact that the family farms already exist, the farmers exist, the only necessary thing being the modernization and development of family households.

An alternative would be to modernize the family households whose structure will remain constant or will only be modified when the number of non-agricultural jobs will constantly increase.

In parallel, new activities can be created – related to wood, rural tourism and agri-tourism, small non-polluting industries.

THE PREMISES OF ARRANGING THE MOUNTAIN AREA FOR TOURISM

The implications of tourism development of an area show the necessity to approach this development through a global conception in which the development of tourism on that territory has to be in correlation with the other activities and sectors, together making a contribution to the environmental-friendly behavior. Development of rural tourism has to be part of the general strategy for economical-social development of this area. For this, one needs to know the following elements first:

- the evaluation of all categories of economical, financial and social categories existing in that area for which the project of arranging the territory for tourism is conceived, in order to assess the area's social and economical potential for development;

- the definition of the directions and orientations of economical growth in the area;

- the evaluation of possibilities and limits of tourism development

The mountains, as tourism and week-end destination have always been on top of tourists' preferences, its place within the tourism traffic being determined by its plurivalence and its accessibility the entire year.

In the last years, the mountains have attracted a great part of the tourism circulation, as a result of both the intensification of tourism phenomena and the relatively recent increase of the interest in winter games. The development of mountain "industrial tourism" at large scale, as well as the development of winter sports requires a tourism arrangement of the mountains.

In conclusion, the tourism arrangement of the mountain area comprises diversified issues which need to be solved, by using specific methods and techniques.

The issues regarding the tourism arrangement of the mountain area comprise the following main aspects:

- tourism arrangement for providing the material base for development of winter sports and mountain "classic tourism"
- tourism arrangement of mountain countryside for establishing the necessary conditions for development of rural, ecological and cultural tourism and development of agri-mountain tourism
- tourism arrangement of national parks (regional) and natural reservations

- tourism arrangement of spa areas

These aspects, which can be different from one area to another, must not be treated separately, because they complement each other. For instance, rural tourism and agri-tourism can be combined with any of the other aspects, thus providing cheaper solutions, especially for solving the problems concerning accommodation and meals. The predominance of great sports areas, parks, reservations or nature and cultural-historical monuments can determine a certain particularization of rural tourism and mountain agri-tourism.

Arranging the mountain households for tourism

In 28 counties with mountain area from Romania we have identified more than 4000 households and agri-tourism hostels.

The concept and structure of households

The household is created by a group of persons who normally live together, are related to one another and have a life in common.

These persons have a full or partial contribution to the household's budget of incomes and expenses, work together the land or breed animals.

The households can have one person or a group of two or more persons, with or without children. Within the household the head is the person who is recognized as such by the other members, in most of the cases the husband.

The important decisions are reached in agreement with the other family members.

The traditional household, under the natural and diversified conditions typical for the mountain areas and facing the general evolution of modern life's requirements cannot reach a level of proficiency that would determine the next generations to remain in the area and to continue breeding animals and developing production.

In this context, it is necessary to enhance the economical and social functions, to improve tourism's organizing and to amplify its destinations.

In general, the way the traditional mountain household is built solves the condition of isolation but do not support the development of the zootechnics production, there are problems regarding the fact that areas too large are occupied with constructions (the house, the annexes and the stable are separate) and they require large quantities of construction materials, the access is not so easy and the functionality is low.

When somebody decides to improve or re-arrange the house must keep the local archaic and rural specificity. The interest in preserving the past civilization must be turned into account. That's why the specificity displayed by the construction materials, work techniques, architecture, decorations, furniture, clothes, food and drinks, language, crafts and so on must be rediscovered, identified and protected against the bad influences of the cities' civilization. It is well-known that in general what is authentic is also simple and functional. Also well-known is the fact that the inhabitants of cities appreciate and admire the values of the Romanian village. For them, the apparent easy living is paid with stress, overcrowding and pollution.

The house and the household must be harmoniously integrated into the natural environment, without being strident. The façade and the entry must be decorated in concordance with the local architecture, providing harmony between the construction and the surrounding vegetation. Although it is good to have traditional equipments within the households and dwellings, it is also necessary to introduce some elements of modern comfort (stove, refrigerator and so on).

The main condition for an agri-tourism farm is to have enough rooms for the family and extra comfortable rooms for tourists. This means that the rooms for tourists should be separated from the ones used by the family.

Conclusions

Agri-tourism represents a chance for the inhabitants of villages, the inhabitants being willing to try a new seasonal (about 100 days per year) activity which would bring them extra incomes. Agriculture remains the basic occupation for the people who practice agri-tourism.

The importance of agri-tourism does not consist only in obtaining extra incomes but also in the contribution to at least 4 great achievements with social value:

- continuity for agricultural activities in a poor productive environment
- prevention of the increase of cities' unemployment rate
- urban society's return to origins – the young generations raised in the cities once again have contact with the rural area
- major contribution to increasing the civilization degree for a great category of population, the farmers, who live isolated, by improving the life conditions.

If to these we add the good effects of an improved infrastructure we have a major increase of life quality.

- agri-tourism represents the safest, quickest and most efficient way to increase the quality or rural products, with direct results generated by the interest manifested by the urban population
- The direct effect of practicing agri-tourism and rural tourism on the urban population is that the labor force is increased, the health status of adults and children is increased as well and the children are educated to respect the real values and the farmers. We must not forget that the children raised in cities do not have a rural culture, they know nothing about the realities in the villages. Thus, agri-tourism becomes a way for them to complete their education.

Performing agri-tourism means not only that the household's incomes increase but also that the civilization degree of the rural population is increased too, by:

- human and animal hygiene
- kind social behavior
- good sense

- better information
- new knowledge on management
- preservation of valuable cultural traditions
- new skills for the farmers (foreign languages, computer literacy and so on)
- better social life

Sustainable development of rural area is the main reason why somebody should start practicing agri-tourism.

Efficient use of the natural environment and of the farms' products – by development of agriculture and tourism.

Tourists expect the tourism product to reflect the main characteristics of the household. They want to see small animals, to eat homemade products and regional specialties, they want to have a direct contact with the host, they want fresh air and solitude. They want to learn more about the rural traditions, culture and nature and about the religious traditions.

They also want to practice sports and to go hiking. In the rural are they can find cultural identity and traditions, harmoniously combined.

Development of mountain agri-tourism certainly leads to integrated development of the Romanian mountain village.

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DEALING WITH CLIMATIC EXTREMES AND THEIR CONSEQUENCES - FLOODS IN ROMANIA

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ABSTRACT:

The paper presents territorial and temporal aspects concerning the floods that occurred in Romania between 1962 and-2006 in response to extreme weather phenomena. The data resulting from the analysis of the elements characteristic to high floods, their intensity and frequency, and the damages produced following such negative events, have led to the writing of a Local flood management plan and a Real-time multimedia monitoring platform for the susceptible areas, together with solutions for the efficient use of water flow regulations in the Bucharest area.

Keywords: damages, extreme events, flood management, floods, vulnerability

INTRODUCTION

Climate changes at the turn of 20th /21st centuries throughout territory of Romania contributed to frequent occurrence of high or catastrophic floods causing damage to farming, communities, and infrastructure.

The factors inducing climatic changes are either natural or entropic. Among the extreme manifestations of the natural phenomena, there are: storms, floods, droughts, earth flows, earthquakes, to which technological accidents may be added (pollution, for instance); thus, conflictual cases may directly influence every person's life and the society itself.

Floods belong to natural phenomena (as a consequence of extreme events) and are an important link in the Earth's natural water chain. These phenomena have marked and still mark the development of human society, as they are also geographically considered the most spread disasters in the world resulting, at the same time, in the highest number of human victims.

Annual data, collected by Romanian Minister of Environment, on hazardous flood with recorded damage in the period of 1962-2006 indicate that in many economic regions of Romania, at the beginning of 21st century, recurrence of high and catastrophic floods increased, over 2001-2007.

Maximum increase in catastrophic flood occurrence was observed in rivers of North, South and Eastern region. Hazardous flood cause analysis over the past decade is indicative of the increase in their levels during spring tide caused by snow or snow-and-rain, as well as abundant rainfall, and blockage on

early flooding. To improve the information-and-prediction support, and to alert to the possibility of high, or catastrophic flood, it is necessary to enlarge the network of rainstorm gauging station to predict high water period. Hydrological observation data that are prepared and published every year should contain information on hazardous floods, and hydrometeorological factors responsible for their generation.

Limiting the effects of these disasters implies an interdisciplinary study of hazards, vulnerability, and risk, as well as the information and education of population.

In the present context, *hazard* is the probable occurrence, in a certain period of time, of a potentially harmful phenomenon both for humans and the environment. Natural hazards are a form of interaction between man and the environment, within which certain adaptability thresholds are exceeded by the society. The presence of human society is necessary for them to take place.

Vulnerability emphasizes to which extent man and his possessions are exposed to various hazards, indicating the level of damage produced by a certain phenomenon, and is expressed on a scale between 0 and 1, with the latter marking the total destruction of the goods and total loss of human lives in the affected area. Environmental destruction determines an increase in vulnerability.

For instance, deforestation determines an intense erosion and landslides, quicker and stronger flooding, and increased vulnerability of settlements and lines of communication.

Risk is defined as the probability of exposing man and his possessions to the action of a certain hazard of a certain size. Risk is the probable level of losing human lives, the number of casualties, the damage to properties and economic activities produced by a natural phenomenon or a group of phenomena in a certain place and period of time.

The correct understanding of the relationship between *hazard*, *vulnerability*, *risk* and *disaster* determines the correct usage of the terms. The relationship is summed up by Alexander (1993) as follows, "Hazard may be regarded as a pre-disaster situation, with a certain risk of disaster occurring, particularly because a human community is in a position of vulnerability." [3]

Thus, he focuses on three stages in the evolution of a natural phenomenon that can potentially generate negative consequences: the hazard stage, followed by the risk of affecting a vulnerable area, finally reaching disaster.

As a consequence of the extreme events that occur both in the world and Europe, the dangerous weather phenomena occurring in the crowded urban areas require highly complex decision-making with respect to protection works against flooding, both on rivers and in the neighbouring lake area. These events happen every spring as a result of snow melting and first rainfalls – serious reasons of concern for local authorities, as every spring smaller or larger flooding occurred, proving once again the weakness of the protection systems against natural disasters. Nowadays, the specialized control of the exploitation

systems has no *models* for the efficient evaluation of the flooding risk and the best use method of such works on the basis of forecast hydrometeorological information.

In 2005, 2006 and even in 2007 Romania faced the devastating effects of these phenomena.

Indeed, insurance costs resulting from extreme weather events have been steadily increasing over the last two decades, in response to both population pressures in region that are at risk, but also because of the frequency and severity of certain forms of extremes are changing. Regions now safe from catastrophic wind storms, heat waves and floods are increasingly becoming more vulnerable to these events. The associated damages costs would consequently be extremely high.

Therefore, flood risk management corresponds to the application of policies, procedures, and practices aimed ar identifying, analysing and assessing risks, as well as treating, monitoring and revaluating them with a limiting purpose so that human communities are able to provide a sustainable physical and social environment.

Flood-produced damages

Material flood damages, worldwide, have dramatically increased in the last few decades and it is really crucial to improve understanding of the reasons. In general, no flat-rate explanation can be given, as river flooding is a complex phenomenon which can be affected by various changes coupled to physical, terrestrial, climate and socio-economic systems. In many areas, human encroaching into unsafe flood-prone areas and increase in the damage potential in floodplains are the principal causes of increased flood risk. However, it is likely that the climate track explains a part of observed changes. Since climate changes affect different flood generation mechanisms (e.g., intense and long-lasting precipitation, snowmelt, ice jams) in different ways, some flood types may become more frequent, while others may become less frequent. Increase in frequency of intense precipitation has been already observed and projections for the future, based on regional climate models, indicate further, very likely, increase.[9]

Climate change will affect the basic elements of life for people around the world – access to water, food production, health, and the environment. Hundreds of millions of people could suffer water shortages, hunger and coastal flooding as the world warms.

All countries will be affected. The most vulnerable – the poorest countries and populations – will suffer earliest and most severely, even while they have contributed least to the causes of climate change. Climate change will lead to an intensification of the global hydrological cycle and will have a major impact on regional water resources. In many parts of the world, variability in climate

conditions – next to many socio-economic and environmental developments – already has major impacts.

Most instantaneous floods resulting from torrential rainfalls with large amounts of water on a given time unit and area are caused by extreme water amounts that occur suddenly and flow quickly, covering large areas. Therefore, they are difficult to forecast and leave little time for people to withdraw in safe places on high lands, and provide themselves with drinkable water, food, warm clothes, means of communication and other essential survival items.

According to the data provided by the Romanian Ministry of Environment, the human and material loss caused by the main floods in Romania between the years 1962 and 2006 are presented according to the following figures:
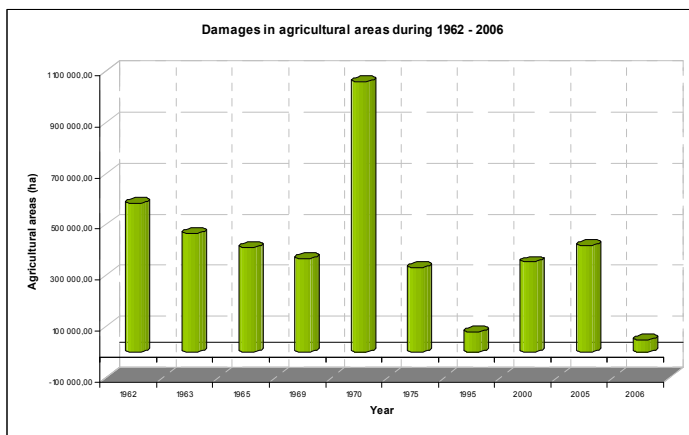
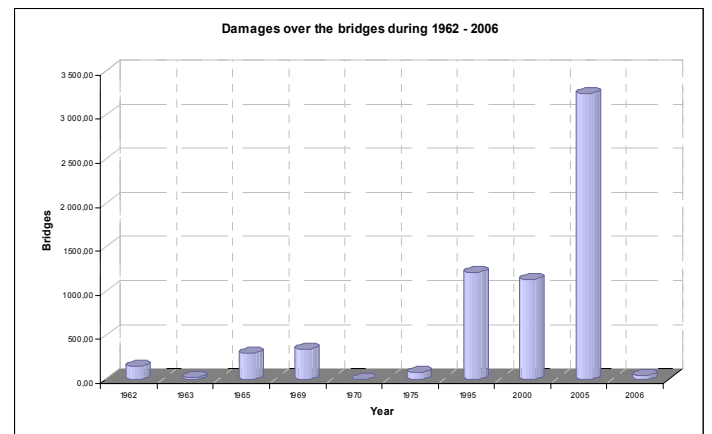*Figure 3: Damages caused by floods in Romania, in agricultural areas, during 1962 – 2006*
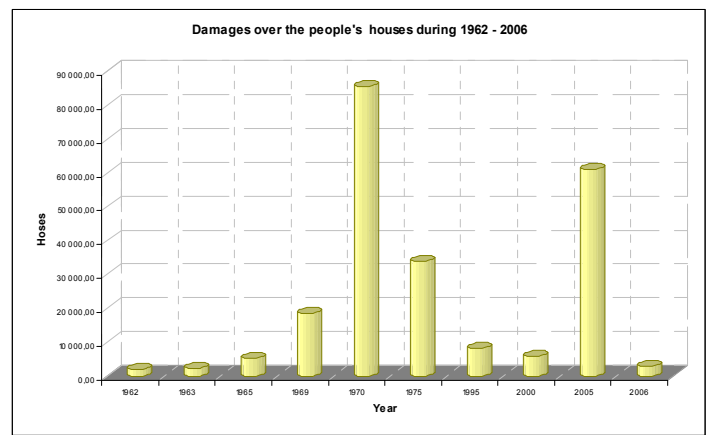
Figure 4: Damages caused by floods in Romania, over the houses, during 1962 – 2006
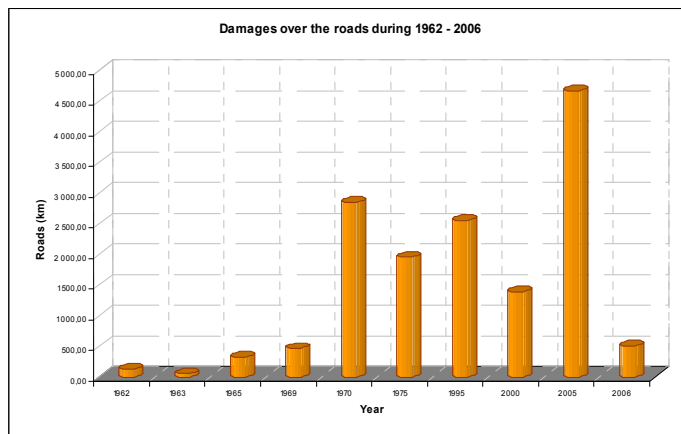
Figure 5: Damages caused by floods in Romania, over the roads, during 1962 – 2006

Figure 6: Damages caused by floods in Romania, over the bridges during 1962 – 2006

Flood-produced damages in Bucharest area

Most floods cause negative social, economic, and ecological effects. The present equipment of the Colentina river is appreciated as under the first class of importance, i.e. the Bucharest area neighbouring the river corresponds to the highest flow, exceeding probability 2%. High floods that may exceed 1% result in exceeding the coping area and breaks in the dams all over the lakes on the Colentina river, with or without the contribution of the Ilfov tributary stream.

The year 2005 was characterized by lower temperatures all over Romania (0.10 ºC lower than the normal temperatures in the reference period, 1961-1990). Reaching normal values resulted from the fact that, during the entire year, temperatures in Romania was characterized by positive deviations between $0.2–2.4^0C$ in six months of the year (January, May, July-September, December) and lower by $0.3– 2.6^0C$ in the other six months (February-April, June, October, November). In 2005, the average rainfalls amount in Romania was 866.5 mm (compared with the normal - 647.0 mm). The rainfalls amounts, higher in the months of January-May, July-September, December, and lower in June, October, November, made the yearly rainfalls rate be higher by 33.9% compared with the reference period of time.

In one week in September 2005, in Bucharest there were recorded total rainfalls of 275 l/mp; In one day, 02 October 2005 in Bucharest 75 l/mp were recorded.
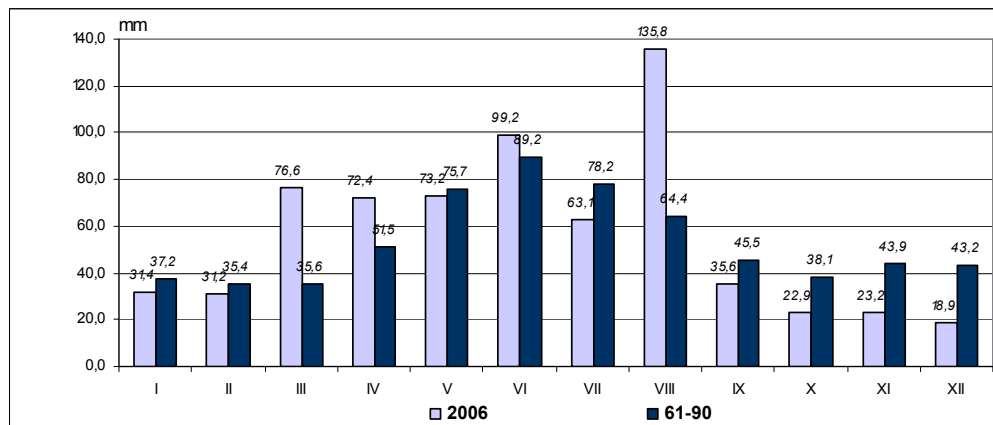

Figure 7: Medium quantities average of rainfalls in Romania in 2006
compared with the climatologychal normal from 1961 to 1990

Bucharest district During 21-30.09.2005	Phenomenon produced	Units affected	Damage value (EURO)
	Abundant rainfalls	781 houses and individual	1,461,838
		43 social and economic	546,757
		22 km roads	381,784
		825 wells	31,541
		Other damages	36,568
		TOTAL	2,458,486

Table 1: Damages produced in Bucharest in the year 2005 [5]

Flood prevention and control measures in Bucharest area:

According to the Romanian regulations concerning flood protection, correlated with the norms established by the European Union, protection against floods, dangerous weather phenomena and accidents occurring at hydro technical constructions is a national activity owing to the importance of the damage that is likely to occur.

From this viewpoint, the situation of the Romanian capital, Bucharest, demands fast and correct decision-making in the case of catastrophic floods, prevention and information of population.

This aim involves real-time identification and assessment of environmental parameters (flows, water level).

The analysis performed in Romania over the last two years, particularly in Bucharest, with respect to infrastructure results in a long series of problems, difficulties and dysfunctionalities. Thus:

• local infrastructure is technically damaged, with a high state of physical and moral wear;

• population's access to vital services is unsuitable due to absent centralized drinkable water systems, waste water sewage, waste gather and storage;

• investments in local infrastructure are inferior to demands, which has negative consequences on the quantity and quality of the services delivered to population and, subsequently, to its living and health standards.

The Bucharest local administration is primarily aimed at managing natural catastrophe risks and their environmental impact. Therefore in 2004, the Bucharest Local Plan for Environmental Action was initiated, which includes several measures aimed to reduce the city vulnerability to flood effects, among which: *legal framework regarding the safe use of dams and water ditches, ground water regulation on the administrative area of Bucharest, writing flood control studies and working systems*, etc.

Hydrological conditions of Bucharest

The Romanian capital, Bucharest, is located on the hydrographic basin of the Arges River, i.e. on the lower flow of the Dambovita and Colentina Rivers that are the main providers of the water demands of the city.

Identification of flood-producing processes and phenomena:

Flooding is extreme physical phenomena generated by an expanse of water (high floods). Knowing the mechanism of producing high floods offers the possibility to prevent and reduce their possible effects. The risk of floods resulting from abundant rainfalls and sudden snow melting is due to the features of the Romanian water flows and the location of some important objectives in flood areas on the one hand, and insufficient protection works on the other.

The analysis of the high floods origin in the Bucharest area shows that, under the given relief and water conditions, the flooding produced by the Dambovita and Colentina Rivers in Bucharest are due to the following causes:

1. *High floods from upstream (flows on the Dambovita River higher than 300 m³/s and on the Colentina River higher than 40 m³/s);*

2. *Extreme rainfalls over Bucharest :In the present situation, the highest flows produced by rainfalls over Bucharest vary between 102 m^3/s at the Grozavesti bridge and 217 m^3/s at the Vitan bridge (probability 1:100 years), or 122 m^3/s at the Grozavesti bridge and 259 m^3/s at the Vitan bridge.*

Nowadays, various national partner institutions are testing the monitoring of the Dambovita River in the Bucharest area between Lacul Morii and the Izvor Bridge.

The currently running project - system destined to flood risk management will purchase on-line the environmental parameters, will provide the data introduction related to the context of this type of hazard in a relational database, will use a complex data-analysis system based on probabilistic reasoning, numeric evaluation methods and on-line database analysis techniques for simulations and prognosis required for decision-making and population information [3].

The assessment of the total flow discharged from the river bed is performed graphically by summing up, according to the water level in the lake measured by a pod located in the canal that leads to the dams, based on the operational features of the large-water dischargers.

These measurements will result in the use of the lake and the daily balance of the water input and output as elements included in the monthly use record of Lacul Morii.

The automatization scheme proposed for measuring the Lacul Morii use parameters comprises a level transducer in the lake, in the near vicinity of the large-water dischargers, a pluviometer with automatic recording placed downstream in the planned area of the Dambovita River, measuring the total flow discharged. The parameters monitored in the lake are: the water level,

defluent flows, rainfalls (measured parameters), tributary stream flows, water volume in the lake (calculated parameters).

The use record includes day, hour, water level, water volume, defluent flow, tributary stream flow.

Conclusions:

The proposed risk-management plan will be based on a decision-making support substantiated by modern IT technologies that will allow real-time coordination, control and information of the decision-making factors and population on fixed and mobile devices. It will be extended to several monitoring points in order to provide real-time information on the surface water parameters and the sewage characteristics in several critical areas of Bucharest. However, approaching the issues referring to the impact of the climatic changes requires specialist data and analysis, since flood risk management involves mainly actions concerning water resource administration and preservation, as well as correct decision-making in the future.

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STUDIES ON VARIABILITY PHENOTYPE OF DIFFERENT GLADIOLI VARIETIES USED IN THE PRODUCTION OF CUT FLOWERS

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ABSTRACT:
In ancient times, gladiola was considered the victory plant because she was worn in wars.
In the study presented there were comments on the characteristics of the air organs, such as blossom precocity, plant height, color panel, the flower shape and floral tijei length.
In the same there has been done a number of biometric measurements to make a proper assessment on the characteristics of different varieties of gladioli.
With the data obtained there were calculated direct genetic parameters such as media (M), standard deviation (s), and a genetically derived parameter, namely the coefficient of variance (% s) for each subject of the observations (ARDELEAN and SESTRAS, 1996).

Key word: Gladiolus gadavensis L., aesthetic characters, variance coefficient, stability.

INTRODUCTION:

Gladioli are perennial, herbaceous plants exceeding 1.5 m in height. On the ground present a tuberbulb, the storage organ of the reserve substances, known to farmers as "onion", flat or globular, covered by the tunic of different colors: black, pink (ȘELARU ELENA, 2001).

Gladiola's Tuberbulbul is composed of two distinct parts: the outer part fine granulated, where it is made the submission of reserve substances, and the internal part,a fibrous tissue (ȘELARU ELENA, 2001).

Gladioli leaves have a sword form and present parallel ribs leaving much relief.

Inflorescence is a spike with flowers placed unilateral or bilateral (one or two lines). The number of flowers in the inflorescence vary between 2 and 12 at wild species and over 20 at varieties grown. (ȘELARU ELENA, 2001).

Multiplying the varieties of the crop, practiced widely in production, is the vegetative by tuberbulbs and tuberbulbsli, because using this method we can gain easier and faster plants capable of flowering (SAND CAMELIA și POP M., 1999).

MATERIAL AND METHOD:

Studies have been conducted for 2 years on 30 plants using 10 varieties of gladioli. The varieties studied present the following characteristics (ŞELARU ELENA, 2001):

White Prosperity is a semitardy variety blooming after about 85 days after planting. It has a height of 130 cm. Inflorescence has a length of 55-60 cm and presents 18-19 flowers in inflorescence. The flowers are very nice, large, with a diameter of 13 cm, white, purple ribbed at the neck, with the edge of petals fringe. It presents two rare tuberbulbs on the plant. It is a tolerant variety at fusariosis but sensitive to attack the trips.

Oscar is a tardly variety blooming after 90 days. Presents a straight stem, 110-120 cm high. The ear lengths 55 cm and the flowers, in the number of 18-19, are beautifully placed in inflorescence. The flowers are large, with a diameter of 12-13 cm, red garnet colored, petaled velvet. It is a variety highly appreciated due to its flowers' beauty and elegance. It is an old variety, sensitive to fusarium oxysporum. The coefficient of propagation is low, at harvest presenting a single tuberbulb, rarely two.

Roz supreme is one of the most popular pink varieties resisting very good also at growing in the solarium. The strain is high, 120 cm, the ear is 38-40 cm and has 19-20 flowers. The flowers are large, with a diameter of 13 cm, light pink color, with yellowish neck. It is a semitardy variety that is blooming 85 days after planting. It is quite sensitive to fusarium but tolerant at trips. At harvest presents 1-2 tuberbulb.

Maria Goretti is a tardy variety, blooming in 92 days after planting, hardy, with a strain of 110-115 cm high and an inflorescence 80-90 cm long. Flowers, in a number of 15-16, are high, with a diameter of 12-14 cm, white with purple throat.

Joli coeur is a semitardy variety, blooming after 80 days of planting, with the strain of 100-115 cm and a ear of 80-85 cm. In the inflorescence presents 10-15 flowers, with a diameter of 10-12 cm and red-orange colored.

Life flame is a semitardly variety blooming after 85 days of planting . It is a hardy variety with the height of 110-120 cm. Inflorescence length is approximately 80 cm and presents a number of 14-15 flowers. The flowers are large, with a diameter of 11-12 cm and blazing red color with cream stripes. The coefficient of propagation is good.

Applause is a tardy variety blooming after 91 days of planting, with the height of 110-120 cm and an inflorescence of approximately 95-105 cm. The flowers are large, 18-20, with a diameter of 9 cm -9.5 and persistent carmine pink color. The coefficient of propagation is good.

Windsong is a variety with flowers of a rare color, purple-mauve with cream neck, blooming late, 100 days after planting. Its height is 105-115 cm and its ear is 90-95 cm. The flowers have 9-9,5 cm diameter and are 15-16 in number. Presents 1-2 tuberbulbs.

Her Majesty is a variety with late blossoming, to 105 days after planting, waist-high, around 120-125 cm. Inflorescence is 95-105 cm long and presents a number of 12-14 flowers. The flowers are large, with a diameter of 11-12 cm and a specific color, with clear blue neck cream. At harvest presents 1-2 tuberbulbs.

Priscilla is a variety recently introduced in our country. The vigor of the plant is the middle of the sea, with a stem of 90-95 cm high. Inflorescence has a length of 50 cm and a number of 16 flowers. The petals are colored petals in light pink with dark pink edge and at the neck have yellow spots. The flower is decorative and stylish, with the edge of petals fringe. It is a variety resistant to trips and tolerant to diseases, with the multiplication factor very large (2-5 tuberbulbs per plant and 30-50 tuberbulbs at every tuberbulb). It is a variety which is suitable for forced crops.

Gladioli were planted in three variants, as random blocks. With phenology observations were made and a number of biometric measurements to make a proper assessment on the characteristics of different varieties of gladioli. Thus, in blossom there has been measured the height of each plant and floral rod length.

All data were statistically interpreted, calculating for all the characters taken into account in this study the direct genetic parameters: the average, standard deviation and genetic derivatives parameters: the coefficient of variance.

For each character were calculated, by statistical analysis methods, media-M,standard deviation-s and coefficient of variance –s%,so to determine the variability in the variety and the actual character for next generations. The lower this coefficient is, the more stable the character is. (ARDELEAN şi SESTRAS, 1996):

< 10%- low variability

10-20%- mid variability

< 20%- high variability

The following formulas were used:

Where: s2= variability

$$S^2 := \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1} \qquad S := \sqrt{S^2} \qquad S\% := \frac{S \cdot 100}{x_m}$$

s = stantard deviation

s% = variability coefficient

x = variant

xm= average

n = type number

RESULTS:

In what concerns the flower color of the varieties studied there are a wide range of colors: from white to purple and blue, through pink, red-orange and red. There were observed differences in the intensity of color and clarity. More interesting are the following varieties: Oscar-crimson, Life Flame-red living with cream stripes, Priscilla-light pink with cream maculata, Windsong-purple-mauve with cream throat and Her Majesty blue-neck with cream.

 Also it is important to know the precocity of different varieties in order to space out over a more long period the flourishing. Most of the varieties fall between 80-110 days.

 Rose supreme varieties, White prosperity and Priscilla presents waist high, the difference between them is not significant. Between Applause, Her Majesty, Maria GORETTA Life flame varieties there are no significant differences. Variety Jolie coeur is the less forceful (107.4 cm), but the difference between him and Maria GORETTA, and Windsong Life flame varieties is not significant.

 For the varieties grown for cut flowers is important that the floral rod to be as long as possible, rigid and to retain elasticity in the vase. In this regard the following varieties draw

attention: Oscar (115.4 cm), White Prosperity (112 cm), Rose Supreme (102.6 cm) and Her Majesty (101.5 cm). Among the Oscar and White Prosperity variety difference is not statistically assured. White Prosperity, Rose and Her Majesty Supreme form a compact group, presenting no significant differences. In the Supreme Rose, Priscilla, Applause, Her Majesty, Maria GORETTA there is no significant differences. The lowest length of floral rod is present at Life flame variety. The difference between this variety and Maria GORETTA and Jolie coeur variety is insignificant, and between them and the other varieties there is a significant difference. This character seems very stable (coefficient of variation is less than 10%). It notes a positive correlation between plant height and floral rod length.

Table 1

Results and observations made on the varieties of studied gladioli

Variety	Color	Preocity (no. of days)	Parametru genetic	Height (cm)	Rod lenght tijei (cm)	No.of flowers / /inflores.
Maria Goretti	White, purple neck	92	M	113.2	86.1	15.3
			s	4.2	5.9	1.9
			s%	6.1	6.7	4.7
White Prosperity	White with purple stripes	96	M	128.1	112	16.5
			s	5.7	5.7	1.7
			s%	4.9	9.1	8.7
Joli coeur	Blazed Red-orange	80	M	107.4	82.3	13.2
			s	5.9	4.8	1.6
			s%	6.1	8.4	5.2
Life Flame	Blazing red, cream stripes	85	M	115.3	79.8	14.1
			s	3.9	3.6	1.4
			s%	7.4	7.8	8.7
Oscar	Crimson	110	M	137.2	115.4	19.9
			s	3.1	5.2	1.5
			s%	5.3	8.5	9.6
Rose Supreme	Pink, white neck	98	M	128	102.6	15.6
			s	3.7	4.5	1.8
			s%	7.4	7.4	8.5
Priscilla	Light pink, cream neck	82	M	125.9	98.7	15.3
			s	5.8	3.4	1.6
			s%	3.9	7.6	8.2
Applause	persistent pink carmine	91	M	115.1	99.1	18.9
			s	3.9	3.8	1.6
			s%	6.4	6.9	5.4

Windsong	Purple lilac, cream neck	100	M	110.5	92.3	15.6
			s	3.9	4.7	1.9
			s%	4.9	9.4	6.7
Her Majesty	Clear blue,cream neck	105	M	120.3	101.5	12.9
			s	4.7	5.3	1.7
			s%	5.2	5.9	4.8

Varieties studied present between 12.9 and 19.9 flowers in the inflorescence. Varieties are grouped into two relatively homogeneous groups. It notes the variety Oscar (19.9 flowers). In this variety, and variety Her Majesty, which has the lowest number of flowers in the inflorescence, the difference is significant but the latter did not differ significantly from the varieties: Rose supreme, Priscilla, Windsong, Maria GORETTA, Life and flame Joli coeur. Applause varieties (18.9 flowers) and White Prosperity does not differ significantly from Oscar variety and also Rose supreme, Priscilla, Windsong. White Prosperity variety does not differ significantly from Her Majesty variety. This character shows a good stability, coefficient of variance is between 4.7 and 9.6%.

CONCLUSIONS:

As a result of our study there are put in evidence a few varieties, which excel by force, the length of floral rod, the number of flowers in the inflorescence and the rate of multiplication: Oscar, White Prosperity, Rose supreme, Priscilla, Applause, Windsong and Her Majesty. These varieties presents a wide range of colors and shades. The varieties with purple flowers and lilac-blue (Her Majesty Windsong and) in particular attract attention because they are colors we rarely encountered in Romania and are increasingly appreciated.

Calculating the coefficients of variance for the characters analyzed gives us valuable clues about the genetic determinism of them, knowing that lower values presents the security strengthening character.

From the Table 1 we can assign the best earlyness to Joli Coeur variety (80 days) and at the latest to Oscar variety (110 days).

In terms of the height of plant Oscar variety is the most forceful, with a height of 137.2 cm, provided statistically superior value.

The coefficient of variation is between 3.9 and 7.4% which shows that species taken in the study are stable in terms of characters taken in the study.

It is recommended to be expanded the culture following varieties: White Prosperity, Priscilla, Applause, Oscar, Windsong and Her Majesty who have behaved in the best conditions in Cluj-Napoca. These varieties can be used successfully as a parental material for gladioli improvement

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