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**Faculty of Agricultural Sciences,
Food Industry and Environmental Protection**

550012 SIBIU, 7-9 Dr. Ion Rațiu St.
Tel.: 00-40-269-211338, fax 00-40-269-212558

Agricultural Sciences and Environmental Protection Department

550373 SIBIU, 31 Oituz St.
Tel.: 00-40-269-234111, fax 00-40-269-234111

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**THE IMPACT OF VARIETY, SOIL MANAGEMENT AND
GROWING SEASONS ON YIELD FORMATION ELEMENTS AND
GRAIN YIELD AMOUNT IN SPRING BARLEY**

MOLNÁROVÁ JULIANA

Slovak University of Agriculture in Nitra

Juliana Molnárová, doc.Ing.Ph.D., Slovak University of Agriculture in Nitra, Tr.A.Hlinku2, 949
76 Nitra, email: Juliana.Molnarova@uniag.sk

ABSTRACT

Field polyfactorial trials were conducted in warm corn production area of Slovakia in years 2002-2004, with three spring barley varieties Annabell, Kompakt, Nitran and two new-breeds KM 2010 and KM 2092, after sugar beet in three repetitions. Four methods of soil cultivation were evaluated: A - conventional tillage, with tillage of harvest remains; B – conventional tillage without tillage of harvest remains; C – minimum tillage - without tillage of harvest remains; D – minimum tillage - with tillage of harvest remains. The share of the variety on achieved yield amounts is estimated to 20% till 28% depending on production conditions of growing season. The highest average grain yield of 5.97 tones per hectare was achieved by Annabell with the highest number of plants and spikes. Yield differences in naked and husky barley varieties in single growing seasons were from 0.62 tones per hectare to 1.56 tones per hectare in behoof husky ones. The highest yield amount was recorded in the case of minimum tillage system without tillage of harvest remains (C soil management system) (5.69 tones per hectare) when also the highest number of plants (233 pieces.m⁻²) and spikes (577 pieces.m⁻²) was determined. Confidence intervals have confirmed statistically significant differences caused by growing season in the number of plants, number of spikes, grain weight and the number of productive shoots. The difference in yield amount due to growing season ranged from 3.16 to 4.00 tonnes/hectare.

KEY WORDS: spring barley, conventional tillage, minimum tillage, yield formation elements, grain yield

In order to ensure effective and ecologic production appropriate to malting and food industry demands is important to search and use new biological material and to

learn its requirements in production technology (e.g. several soil tillage systems) according to agroecological conditions of the production area.

Fundamental for successful barley production is the correct selection of variety suitable for given site. The share of the variety on achieved yield amounts is estimated to 25% till 40% depending on production conditions of growing season [15, 18, 22].

The influence of tillage systems on the yield amount and spring barley quality was studied by several authors. The way of tillage – either conventional or no tillage system have to match to the given production area [3]. By the selection of tillage system it is important to differentiate the demands for optimal soil process conditions and crop demands for soil environment. Soil cultivation depends on the fore crop, soil type, production potential and physical soil properties [9]. In the future it is important to combine properly the conventional tillage system with no tillage system or several ways of soil protective management systems [20]. No tillage systems where the correct selection of crop rotation is very important are matching to both environmental and economic aspects [9]. Minimum soil management systems are applied especially by cereals, because this group of field crops doesn't respond to the depth cultivation and doesn't demand loose soil [3, 19 and other]. Another plus is that the lower level of mineralization increases the content of organic matter in top soil upper sections [16, 14]. After long-term evaluation of soil protective and conventional technologies in Canada there were stated that grain yield was for 23 – 27% higher by conventional tillage but the highest yield amount was achieved by soil protective tillage system [4].

On the university in Delaware within the evaluation of several soil management systems (conventional and minimum ones) impact on the grain yield – the highest grain yield was achieved by no-tillage system [23]. According to autor's good results of no-tillage system consist in good management, i.e. selection of proper soil protective technology, fertilization planning, variety selection, sowing rate and herbicide treatment. Statistically significant increase in spring barley yield produced

on light sandy soils was achieved by soil protective technology as compared to conventional technology. It relates to soil protective and water-conservation effects of adopted technology which affect the physical soil properties and water saving in the soil [7]. Lower yields in soil protective technologies compare to conventional ones were observed by authors [23, 8, 17]. Lotter et al., [13] based on study of soil protective technologies in extremely dry climatic season in eastern part of U.S.A. have stated that soil protective tillage was for 100 % more effective regarding the soil moisture keeping than conventional soil management. Kulík and Líška [11] have stated that as for the soil cultivation in the case of spring barley production the agro ecological conditions of Slovakia aren't suitable for long term "no-tillage" production systems. They can be used "ad hoc" in cases when they seem to be the most suitable.

Objective of the paper is to point out the impact of different soil management methods and that of varieties on the formation of yield elements and the yield amount in spring barley in climatically different growing seasons.

MATERIAL AND METHODS

Field polyfactorial trials were conducted on experimental plots of the Faculty of Agrobiology and Food Resources, Slovak University of Agriculture in Nitra during 2002-2004 with three spring barley varieties Annabell, Kompakt, Nitran and two new-breeds KM 2010 (KM-96) and KM 2092 (KM-98). The fore crop was sugar beet. The size of experimental plots was 14 square meters. Four methods of soil cultivation were evaluated: A - conventional tillage up to a 0.18 – 0.20 m depth with tillage of harvest remains; B – conventional tillage up to a 0.18 – 0.20 m depth without tillage of harvest remains; C – minimum tillage - (disking up to a 0.12 – 0.15 m depth) without tillage of harvest remains; D – minimum tillage - (disking up to a 0.12 – 0.15 m depth) with tillage of harvest remains. The yield was re-counted on 14 % moisture content.

Samples of biological material in growing phase BBCH 85 – 89, from area of 1 square m, in all soil management ways and three repetitions were taken in order to

determine the accumulation potential. Evaluated were accumulation potential parameters as follows: number of plants per 1 square meter before harvest (pieces per 1 square meter), an average number of productive shoots per 1 square meter (pieces per 1 square meter), an average number of productive shoots per 1 plant (pieces), number of spikes per 1 square meter (pieces per 1 square meter), number of grains per 1 spike (pieces) and the weight of grains per 1 spike (g).

Experiment results were statistically evaluated using the software Statgraphics and Statistica 6.1. Methods as follows were used: multifactorial analysis of variance, multiple comparison test, method of confidence intervals.

For more detailed determination of grain yield data the evaluated factors have been tested by the analysis of variance and by the multiple range test (Tukey test) on 95% and 99% reliability level ($\alpha=0,05$; $\alpha=0,01$).

The trial area is classified and characterized as a warm macro area and a very dry subarea with an average annual precipitations of 561 mm (1951-1980), 333 mm during the vegetation period and an average year temperature of 9,7 °C (1951 - 1980), 16,3 °C during the vegetation period.

The trial stand is located on brown soil with clay subsoil. The soil is middle supplied in P and well in K. The humus content in topsoil is middle (1.20 – 2.07%). The soil reaction is acid up to subacid (active pH 5.9-6.5; exchange pH 5.0-5.5) [5].

RESULTS AND DISCUSSION

Varieties

Achieved results refer to statistically significant difference in yield amounts of evaluated varieties. For the whole trial the highest average grain yield of 5.97 tones per hectare was achieved by Annabell variety. It gave statistically higher yield compare to Nitran and Kompakt variety.

Statistically significant was also the difference among Annabell, KM- 2092, and KM-2010 varieties (from 0.81 tones per hectare up to 1.56 tones per hectare) in behoof the Annabell variety, and between K- 2092 and KM-2010 new-breeds, too.

In average for evaluated growing seasons husky varieties have achieved for 1.08 tones per hectare higher yield amounts compare to evaluated naked new-breeds

which is in conformity with Hang et al. [6]. Yield differences in naked and husky barley varieties in single growing seasons ranged from 0.62 tones per hectare up to 1.56 tones per hectare in behoof husky ones.

In term of grain yield interactions the relation between *variety* and *growing season* was highly significant (the highest yield amount was observed by interaction: Nitran variety x 2004 growing season) (Figure 4.). The share of the variety on achieved yield amounts is estimated to 20% till 28% depending on production conditions of growing season. The authors [15, 18, 22] amounts 25% till 40%.

From evaluated husky varieties the highest number of plants and spikes was achieved by the Annabell variety. Compare to other varieties (Nitran a Kompakt) the difference was statistically highly significant. Regarding new-breeds – higher number of plants and spikes was achieved by KM-2010 (Figure 5, 6). There were any statistically significant differences in the number of productive shoots in evaluated varieties. The highest number of grains per spike was determined by Kompakt variety (23.47 pieces per spike), between this variety and the KM-2010 new-breed (20.98 pieces per spike) was observed statistically significant difference (Figure 7).

In average for evaluated three year period the highest grain weight per spike was determined by the Nitran variety (0.83 g) (Figure 8). The Annabell variety achieved 0.64 g and Kompakt 0.73 g. The grain weight by KM-2010 and KM-2092 new-breeds achieved 0.61 g and 0.66 g. The differences of grain weight per spike in evaluated varieties and new-breeds compare to the Nitran variety were statistically highly significant.

Soil cultivation

The soil management system influenced the yield amount statistically highly significant. In all evaluated soil management cultivation the highest yield amount was observed in the case of minimum tillage system without tillage of harvest remains (C soil management system) (5.69 tones per hectare) (Figure 9), when also the highest number of plants and spikes was determined. These results are consistent with conclusions of Walker [23], who achieved the highest grain yield in no tillage soil

management system, too. Entz et al. [4], Kitchen et al. [8], Ryan et al. [17], report higher yield amounts by protective soil management, too. Comparing the C soil management system (minimum tillage without tillage of harvest remains) and the A soil management system (conventional tillage with tillage of harvest remains) statistically significant yield increase (for 0.61 tonnes per hectare) in behalf of the C soil management system was determined. Lotter et al. [13] reported that reduced soil management system during extremely dry climatic growing season was more effective in moisture retention than conventional soil management system which is consistent with our results from 2003. The tillage of sugar beet harvest remains haven't caused an yield increase in any evaluated soil management system which is consistent with results of Candráková - Kulík [1].

The soil management levels have had a significant influence on the number of plants and the number of spikes (Figure 10, 11) in average for three growing seasons. The highest number of plants (233 pieces per square meter) and the number of spikes (577 pieces per square meter) was determined by minimum soil tillage system (C). Statistically significant differences in the number of plants and the number of spikes were determined between the soil management systems C and D.

Interactive relations of *variety x soil management system* have had highly significant influence on the grain yield (the highest yield amount was achieved in interaction Annabell x C soil management system and the number of spikes (the highest number of spikes was achieved in interaction KM-2010 x C soil management system. Significant influence on the number of plants (the highest number of plants was determined in interaction KM-2010 x C soil management system .

•Growing season

Results have confirmed statistically high variability of yield amounts owing to the growing season (Figure 12). An average grain yield amount for the whole experiment period achieved 5.87 tonnes/hectare and the difference among growing seasons was 3.16 to 4.00 tonnes/hectare .

The growing season of 2002 according to precipitation total (302.50 mm) can be characterized as normal (92.23% CN) and according to average temperature (9.70 °C) as warm (+116.87% CN) (Figure 1 and 2). Uneven precipitation distribution after barley sowing (there were only 9.30 mm precipitation from March 22. to April 12.) have extended the first critical period (sowing – emergence period) with the view of plant number formation as the basic yield formation element and with negative effect on the field emergence rate. Another dry period in May (lasting from May 6. to 24., 2002; precipitation total of 6.20 mm) have had a negative impact on the formation of productive shoots. Šoltysová - Danilovič (21) refer that colder and damper weather in May has a positive influence on the yield amount in malting barley because for the yield and grain quality formation are about 14°C May temperatures of great importance. During the period of barley maturing (from June 12. to 30.) high temperatures (up to 26.50 °C) and low precipitation total (7.70 mm) have caused decrease in GW - *1000 grains weight* (41.5 g). The decrease of final yield amount (5.10 tonnes/hectare) comparing to the best growing season of 2004 (for 3.16 tonnes/hectare) was caused by lower number of spikes (for 83 pieces.m⁻²) and lower GW (for 3.2 g). Differences in basic yield formation elements in single growing seasons were statistically highly significant (Figure 13, 14, 15, 16). Danilovič - Mati, (2) after studying the influence of weather condition on the grain yield formation during and outside the vegetation period of spring barley came to the conclusion that the shortening of growth stages effects the formation of stand production and accumulation potential whereas the dependence between the final yield amount and the number of grains per area unit is almost linear.

The growing season of 2003 was least favourable for the spring barley production from all evaluated seasons. According to precipitation total it can be characterized as very dry (62.80% CN) and as for the average temperature as warm (110.54% CN). Extremely dry were March with precipitation total of 2.3 mm (6.97% CN), April and June with precipitation total of 27 mm, resp. 6.5 mm (62.79% to 9.29 % CN). Comparing to the best growing season (2004) the number of spikes decrease

for 30 pieces.m⁻² and the lowest grain weight per spike (0.62 g) from all evaluated growing seasons what resulted in the lowest average yield amount from all evaluated seasons (4.26 tonnes/hectare). The yield amount decrease (compare to growing seasons 2002 and 2004) for 0.84 up to 4.00 tonnes/hectare (i.e. 16.5 % to 48.4 %).

During the third evaluated growing season of 2004 the temperatures were in conformity to the 30 year normal level, according to precipitation totals March and June were wet. The precipitation total achieved 160% resp. 134% CN. During this growing season the highest grain yield amount was achieved – 8.26 tonnes/hectare in average for the whole experiment period. The yield increase compare to seasons 2002 and 2003 was 161.96 % to 193.9 %. Favourable weather course have had a positive impact on the formation of productive shoots (Figure 15) and after all on the final grain yield amount, too. The number of plants and number of spikes in 2004 and 2003 seasons was quite well-balanced (Figure 13, 14). By the method of confidence intervals were statistically confirmed differences due to growing season in the number of plants, number of spikes, GW and the number of productive shoots (Figure 13, 14, 15, 16). Statistically significant differences in the number of grains per spike due to the growing season were not confirmed.

CONCLUSION

Results referred to statistically significant difference in yield amounts among evaluated varieties. The highest average grain yield of 5.97 tones per hectare was achieved by Annabell with the highest number of plants and spikes. Differences in yield amounts of naked and husky varieties ranged in single growing seasons from 0.62 to 1.56 tones per hectare and achieved 1.08 tones per hectare in average for three years to behoof husky varieties. The share of the variety on achieved yield amounts is estimated to 20% till 28% depending on production conditions of growing season. The highest number of grains was noted for Kompakt variety (23.47 pieces per spike). The highest yield amount was recorded in the case of minimum tillage system without tillage of harvest remains (C soil management system) (5.69 tones per

hectare) when also the highest number of plants (233 pieces.m⁻²) and spikes (577 pieces.m⁻²) was determined. By the method of confidence intervals were statistically confirmed differences due to growing season in the number of plants, number of spikes, GW and the number of productive shoots. The difference among growing seasons was 3.16 to 4.00 tonnes/hectare .

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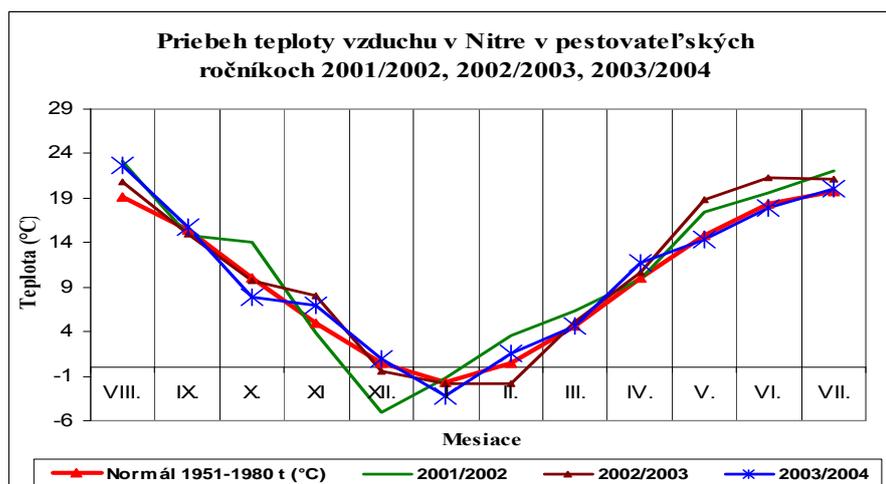


Fig. 1: The course of air temperature in Nitra during 2001/2002, 2002/2003, and 2003/2004 growing seasons

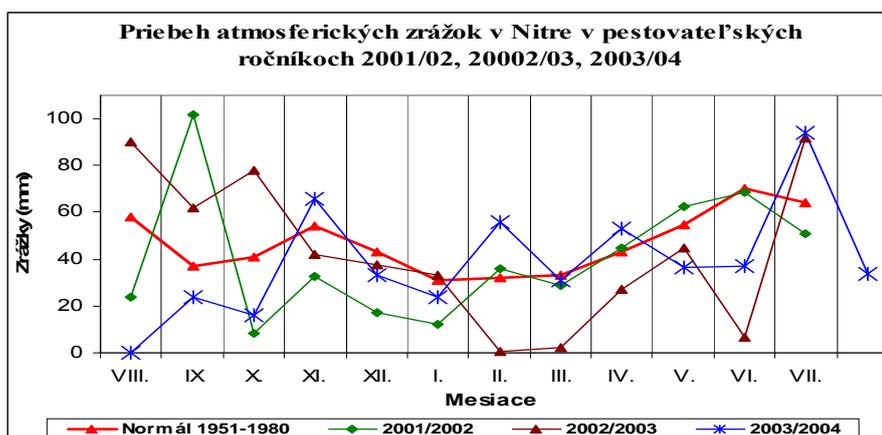


Fig. 2: The course of atmospheric precipitations in Nitra during 2001/2002, 2002/2003, and 2003/2004 growing seasons

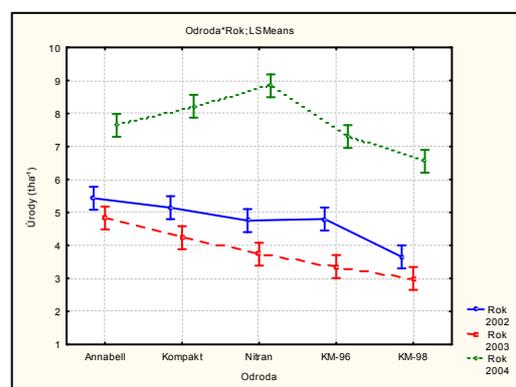
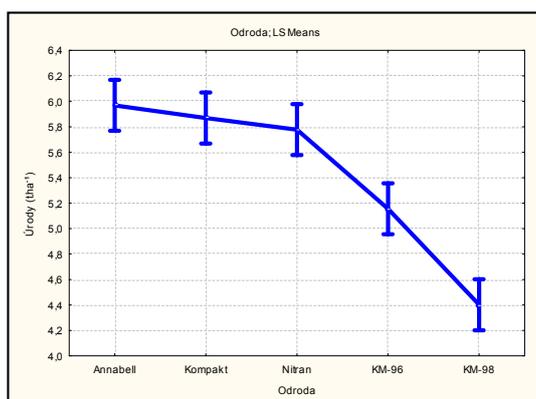


Fig. 3: Average grain yield amount depending on variety. Averages and 99% confidence intervals.

Fig.4: Average grain yield amount depending on variety and growing seasons. Averages and 99% confidence intervals.

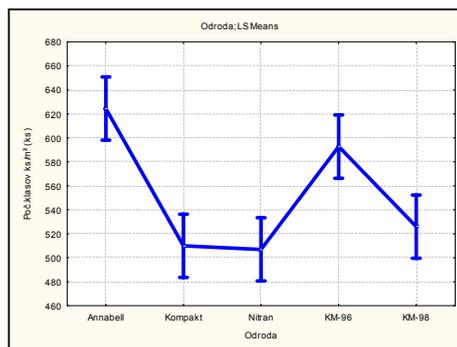
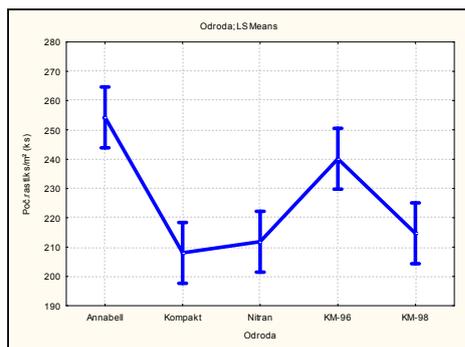


Fig. 5,6: The number of plants and number of spikes depending on variety. Averages and 99% confidence intervals.

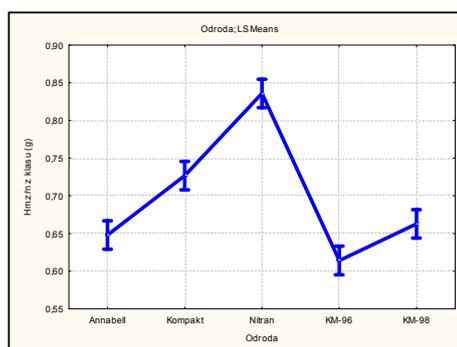
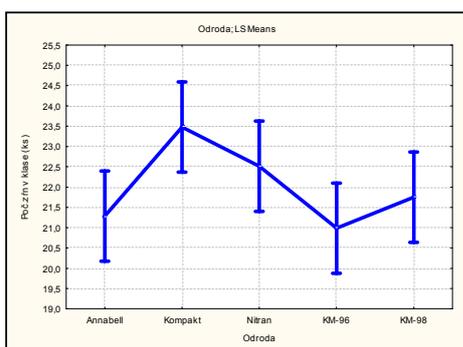


Fig. 7,8: The number of grains per spike and the grain weight per spike depending on varieties. Averages and 99% confidence intervals.

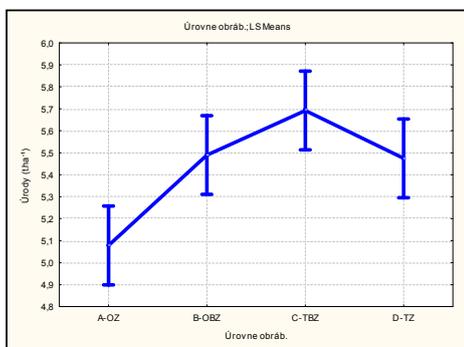


Fig. 9: An average yield amount depending on the soil management level. Averages and 99% confidence intervals.

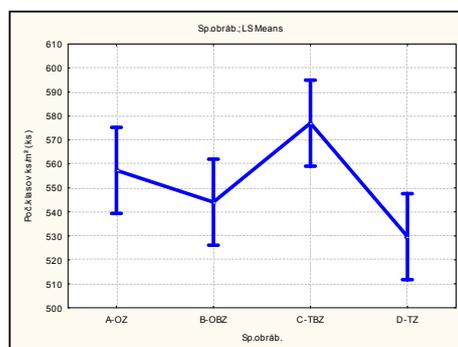
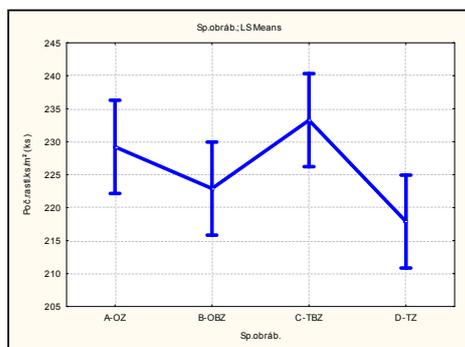


Fig. 10, 11: The number of plants and the number of spikes depending on the soil management level. Averages and 99% confidence intervals.

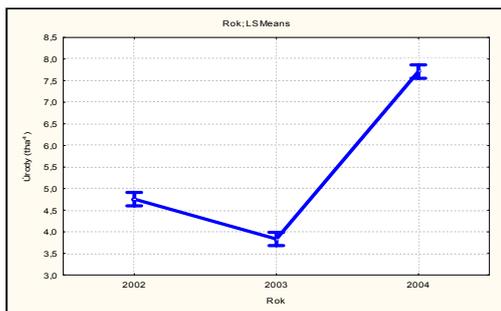


Figure 12: An average grain yield depending on growing season
Averages and 99% confidence intervals

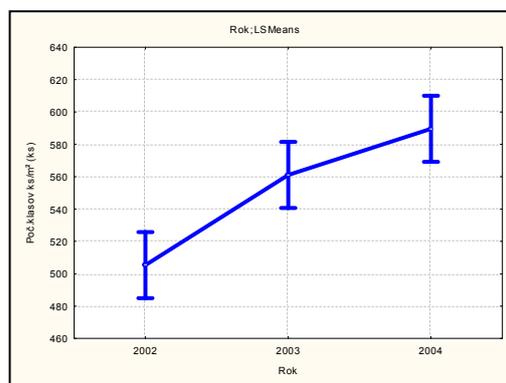
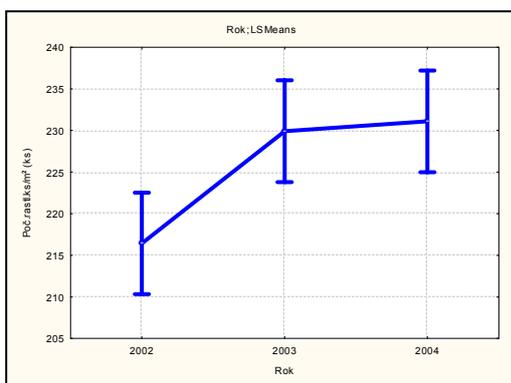


Figure 13, 14: Number of plants and number spikes depending on the growing period
Averages and 95% confidence intervals *Averages and 99% confidence intervals*

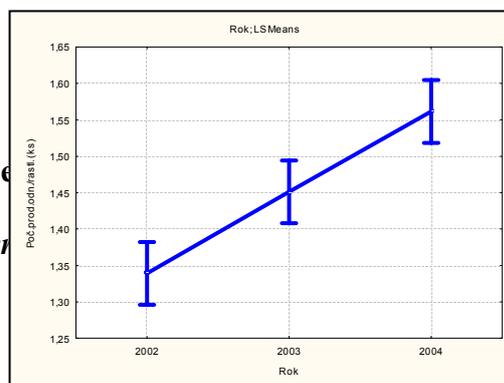
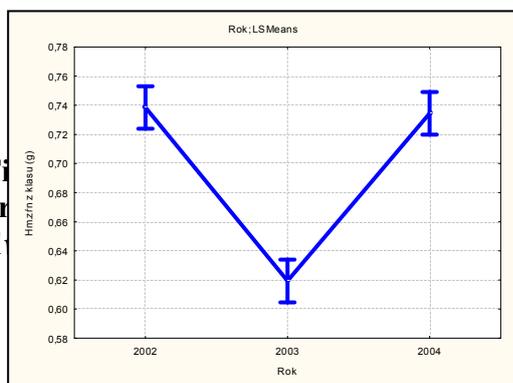


Figure 15, 16: Average grain weight and the average grain yield depending on the growing period
Averages and 95% confidence intervals

THE WITHIN CONTROL OF THE POPULATIONS OF
DIABROTICA VIRGIFERA VIRGIFERA LE CONTE IN THE
MUREȘ COUNTY

ANTONIE VLAD IULIANA¹, TĂNASE MARIA¹, NEAGU MARIA²

1. The Faculty of Agricultural Sciences, Food Industry and the Protection of the Environment Sibiu, str. Oituz, nr.31,
2. Sanitary Unit for Plants Mureș

ABSTRACT:

Diabrotica virgifera virgifera Le Conte, belonging to Coleoptera order, Chrysomelidae family is a new pest in Europe.

In Romania *Diabrotica virgifera virgifera* was noticed for the first time in 1996 in the Nădlac – Arad area. The researches and monitoring of this coleopteran are still on as it migrates permanently comprising large areas that are cultivated with corn. These areas also provide good climate conditions for the evolution of the species.

In the Mureș County the pest was noticed for the first time in 2001. During 2001 – 2005 the species *Diabrotica virgifera virgifera* was intensively monitoring, there being placed two kinds of traps: the traps with attractive sexual pheromone and yellow adhesive panels. The monitoring was done in 5 collecting points: Tg. Mureș, Târnăveni, Luduș, Reghin and Sighișoara. The pursuit of the dynamics of the number of the grown-ups as well as the evaluation of the damages produced by larvae on the roots was done for 14 weeks during the 15th June and 15th September annually. We established that during 2003 there were captured 760 adults, the maximum number being recorded in July – 393 adults.

KEYWORDS: *Diabrotica virgifera virgifera* Le Conte, within control, Mureș County

INTRODUCTION

Diabrotica virgifera virgifera Le Conte, belonging to Coleoptera order, Chrysomelidae family is a new pest for Europe. It came from Northern America where is alongside with other species of *Diabrotica*, a very dangerous pest for the corn cultures. It is nicknamed *popular western corn rootworm*. This pest also causes

problems in some European countries such as: Serbia, Croatia, Hungary, Bosnia-Herzegovina, Bulgaria, Italy, Switzerland, Slovakia, Ukraine, France, Austria, Czech Republic, England, Holland, Belgium and Spain.

In Romania *Diabrotica virgifera virgifera* was noticed for the first time in 1996, in the Nădlac – Arad area. Afterwards the pest was also identified in other areas in the west and south – west of the country, namely in: Arad (1996), Timiș, Caraș-Severin (1997), Bihor, Mehedinți, Hunedoara (1998), Dolj (1999), Satu-Mare, Sălaj, Alba, Olt (2000), Mureș, Sibiu (2001), Maramureș (2005).

The researches and monitoring of this coleopteron are still on because he migrates continuously and it will comprise large areas cultivated with corn. These areas also provides good climate for the evolution of the species.

Monitoring the species *Diabrotica virgifera virgifera* Le Conte in Mureș county aims to know the spreading of this pest in the county, to establish the density of the pest, to evaluate the damages done by the pest as an adult as well as a larva and to apply the most efficient measures of the within control.

MATERIAL AND METHODES

- ✓ The time interval for investigation was 2001 – 2005.
- ✓ The gathering method:
 - The traps with attractive sexual pheromone, which attracts the males but accidentally also the females.
 - Yellow adhesive panels, which attracts both the males and the females.

Both the traps with pheromones and the adhesive ones were put in micro cultures of corn having surfaces more than 2 hectares.

- In order to monitoring the larvae estimating damages on the roots there was examined the radicle system of each and every researched plant.
- ✓ The monitoring interval was of 14 weeks: 15th June to 15th September. During this time there were registered weekly the captured adults and the pheromone traps were changed monthly.

- ✓ The localities where *Diabrotica virgifera virgifera* was monitoring were: Tg. Mureș, Târnăveni, Luduș, Reghin, Sighișoara.
- ✓ The investigation of the dependence of the population of *Diabrotica virgifera virgifera* on the values of the temperature during the monitoring period.
- ✓ The identification of the most efficient measures of the within control

RESULTAT AND DISCUSSIONS

The Mureș county has a surface of 671.388 hectares from which 222.495 hectares are worked fields: 116.168 hectares pastures, 68.903 hectares with hay, 5.139 hectares orchards, 2.104 hectares vineyards. The surfaced that is not cultivated is of 256.579 hectares. From the worked surface 32% is cultivated with corn for eating and seeds (table 1).

Table 1

The corn cultivated surfaces with corn in the Mureș County during 2001 – 2005

Year	The entire corn cultivated surface	The eating corn cultivated surface	The seed corn cultivated surface
2001	77.949 ha	77.825 ha	124 ha
2002	79.048 ha	78.831 ha	217 ha
2003	74.705 ha	74.485 ha	220 ha
2004	62.572 ha	62.500 ha	72 ha
2005	64.667 ha	64.598 ha	69 ha

1. The dynamics of the population of *Diabrotica virgifera virgifera* estimated to the number of adults during 2001 – 2005

During 2001 – 2005 within the Unitatii Fitosanitare Mures (Sanitary Unit for Plants) there was done the monitoring of the western worm of corn cultivated in a single culture (table 2).

Table 2

The dynamics of the number of adults belonging to *Diabrotica virgifera virgifera* in the single corn cultures in the Mureș County during 2001 – 2005.

Year	Pheromone traps	Adhesive traps
2001	14	0
2002	7	0
2003	760	0
2004	131	0
2005	237	0
Total	1149	0

During 2001 there were captured 14 adults of *Diabrotica virgifera virgifera*; during 2002 only 7. Then the number increased: in 2003 – 760 adults. In 2004 there were captured 131 adults and in 2005 there were caught in the traps 237 adults.

In the same time we noticed the efficiency of the pheromone traps where were caught 1149 adults, comparing to those with adhesive that proved to be useless.

2. The dynamics of the number of adults belonging to *Diabrotica virgifera virgifera* le Conte during 2003 in the single corn culture in the Mureş County

During 2003 the first adult insects were captured during 1st – 5th of June, the maximum being registered in July – 393 adults, and in August 363 adults (close to July values). In September were collected 4 samples. Totalul exemplarelor capturate pentru 2003 a fost de 760. (Table 3)

Table 3

The dynamics of the number of adults belonging to *Diabrotica virgifera virgifera* le Conte during 2003 in the single corn culture in the Mureş County

Nr Crt	The check on period	Tg. Mureş	Târnăveni	Luduş	Reghin	Sighişoara
1.	15 th -21 st June	0	0	0	0	0
2.	22 nd -30 th June	0	0	0	0	0
	Total June	0	0	0	0	0
3.	1 st -5 th July	0	6	0	0	0
4.	6 th -12 th July	0	20	0	0	0
5.	13 th -19 th July	9	35	42	7	0
	Total 1 st –19 th July	9	61	42	7	0
6.	20 th -26 th July	14	41	88	16	0
7.	27 th -31 st July	16	39	50	10	0
	Total 20 th – 31 st July	30	80	138	26	0
8.	1 st -5 th August	14	50	56	14	0
9.	6 th -12 th August	13	41	50	11	0
10.	13 th -19 th August	13	36	23	8	0
	Total 1 st – 19 th August	40	127	129	33	0
11.	20 th -26 th August	4	13	10	2	0
12.	27 th -31 st August	0	2	3	0	0
	Total 20 th – 31 st August	4	15	13	2	0
13.	1 st -5 th September	0	4	0	0	0
14.	6 th -15 th September	0	0	0	0	0
	Total September	0	4	0	0	0
	Total on each collecting point	83	287	322	68	0
	Total collected adults	760				

These values are the results of the biologic possibilities of the species to increase the level of the population as well as the weather conditions, which in that year were extremely favorable (table 4).

3. The investigation of the dependence of the population of *Diabrotica virgifera virgifera* on the values of the temperature during the check on period.

Table 4

The temperatures during 2001 – 2005 at the weather forecast station in Tg. Mureş – in Celsius degree

Year/Month	2001	2002	2003	2004	2005
01	-0,4	-3,6	-3,2	-4,7	-2,9
02	0,4	2,6	-5,7	-1,3	-4,9
03	7,1	6,1	3,4	5,0	1,7
04	10,5	10,3	10,0	11,6	9,6
05	15,5	17,7	23,8	14,2	15,0
06	17,3	19,4	21,9	16,5	17,2
07	21,0	22,3	21,4	20,1	19,7
08	21,2	19,3	21,7	19,1	19,2
09	14,6	14,6	14,6	13,8	15,6
10	11,2	9,9	7,9	10,1	8,9
11	2,3	5,2	4,7	4,3	2,1
12	-7,5	-2,8	-2,3	-0,1	-1,0
Total	113,2	121	118,2	108,6	102,8
Average	9,4	10,1	9,8	9,1	9,3

From literature [Rosca, 1999] as well as from practice there is common knowledge that the high temperatures, the drought and the early sowing encourage the attack of *Diabrotica virgifera virgifera*. In the Table 4 one can notice that the monthly average temperatures in 2003, May, June, July and August are higher than the temperature average. And the annual average temperature in 2002 and 2003 is also higher than the usual one; the period corresponds to the maximum of captures of *Diabrotica virgifera virgifera* that were recorded in the Mureş County.

The analysis of the data in the table 3 and 4 underlines the fact that in the hotter areas as Luduş and Târnaveni there was collected a higher number of adults and namely 322 and respectively 287 opposite the cold areas where the number of

collected adults was lower. In Reghin area the number of captured adults was of 68 and in Tg. Mureş of 83. In Sighișoara area there were no collected adults.

4. The monitoring of the larvae through the estimation of the damages produced to the roots

For the estimation of the damages produced by the larvae on the roots in the Mureş County there were picked 5 working points within the Sanitary Unit for Plants (Tg. Mureş, Târnăveni, Luduş, Reghin, Sighișoara) that correspond to a number of 5 soils of single culture. The check in was done 30 days after the apparition of the adults of the new generation and at the harvesting of the corn.

All the plants were analyzed according to the IOWA scale and were given 1 that meaning no attack was done.

5. The within control of the populations of *Diabrotica virgifera virgifera* Le Conte in Mures County

Taking into consideration the attack way as well as the produced damages there is appreciated as being of a special importance the attack of larvae and of less importance the attacks of the adults.

There was also established that the damages grew when corn was cultivated running many years as a single culture, when it was early sowing and when there were applied nitrous fertilizers.

The proposed measures are as follows:

- Agricultural and techniques measures:
- ✓ The rotation of the cultures as an excellent method in the controlling this pest, because the eggs are almost exclusively laid in the corn cultures. The new larvae have to find and to feed themselves on the corn roots in a short period of 3 days after their appearance. So the lack of the corn culture will lead to the disappearance of the larvae.

- ✓ Establishing the sowing time also influences a lot the attack of the insect. By delaying the sowing of the corn there is reduced the grade of the availability of the roots and in this respect, without food the larvae will die sooner.
- ✓ Harvesting in time and the cultural hygiene prevents shaking of the beans and the forming of self- sown plant where *Diabrotica virgifera virgifera* can develop.
- ✓ An early cultivation of some trap rows can give good results. These rows are placed nearby the place where the corn culture is going to be placed, and *Diabrotica virgifera virgifera* will settle in these places and so being easier killed.
- ✓ The cultivation of hybrids having well developed radicle system. These can face the pest attack. There are known as resistant ones a number of varieties (Haya Golden, Golden Republic, Midland Yellow Dent), synthetic populations (Iowa Stick Stalk Synthetic, PI-CO Synthetic) and consanguine lines (SD 10, B69, Mo22, Oh05, b14, A231, W202) [Rosca, 1999].
- Chemical measures:
 - ✓ In case of single culture against larvae there are applied granulated insecticides on the row in the same time with sowing the corn. The insecticides incorporates in the soil at 0.5 – 2.5 cm. in depth. This method does not combat completely the pest, giving it the possibility to spread farther.
 - ✓ In the case of the adults there are applied insecticides for reducing their number as well as preventing them from laying eggs that leads to a decrease in number of the larvae population under the economic damage threshold.
There must be specified the fact that the treatment is done only when it is necessary and after intense monitoring.

CONCLUSIONS:

1. *Diabrotica virgifera virgifera* Le Cont extended its spreading area in the Mureş County;

2. The number of the captures done with the help of the pheromone traps confirms the presence of the species, the population being a small one, no economic damages done;
3. There was proved the efficiency of the sexual attractive pheromone opposite to the yellow adhesive panels; in the latter one no capture was registered;
4. The monitoring of the adults was done during 15th June – 15th September, the maximum of captures being registered in August;
5. The dynamics of the number of adults of *Diabrotica virgifera virgifera* Le Conte in the Mureș County oscillated from one year to the other, the determinant factor being the physical one, mainly the temperature;
6. The factors that influenced the multiplication and spreading of the pest in the Mureș County are: the large surfaces cultivated with corn, the single corn culture and the relative high density of the plants.
7. During the monitoring period there was noticed no attack of the larvae upon the plants;
8. This dangerous pest of the corn should be further monitoring for prevention and limitation of its extension and in order of applying an efficient biologic control.
9. The within control of the populations of *Diabrotica virgifera virgifera* Le Conte in the Mureș County can be done using the agricultural and technical methods (as: the rotation of the cultures, establishing the sowing time, the harvesting in time as well as the cultural hygiene, the early cultivation of same trap rows, the cultivation of hybrids having a well developed radicle system) and also chemical ones both for larvae and adults.

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DIRECT DETERMINATION OF HEAVY METALS IN PLANT SOLID SAMPLES USING HR-CS AAS

PAVEL BIANCA-PETRONELA, BARBU CONSTANTIN-HORIA,
SAND CAMELIA, POP MIHAI-RADU, MOISE CRISTINA

“Lucian Blaga” University of Sibiu, Faculty of Agricultural Sciences, Food Industry
and Environmental Protection, Ro-550024 Sibiu, 10 Victoriei Bv.

* E-mail : horiab@rdslink.com

ABSTRACT

One of the most useful analytical methods for the determination of heavy metals, atomic adsorption spectroscopy, has entered in a new phase, due to the possibility of analyzing directly solid samples, without any digestion.

*The paper presents the application of this technique to the determination of Cd in stems of *Miscanthus sinensis x giganteus*, a plant that could be cultivated on soils pooluted with heavy metals.*

KEYWORDS: high-resolution continuum source AAS, cadmium, *Miscanthus*, Copsa Mica

INTRODUCTION

As many know, atomic absorption spectrometry (AAS) is one of the widest used techniques for determination of heavy metals, its accuracy, reliability and simplicity being proven in laboratories all over the world. But, as also many can tell, classical AAS has several disadvantages, such as the necessity of changing the hollow cathode lamps according to the element(s) to be determined and the impossibility of analyzing samples but in liquid state, this meaning that any solid material should be brought in solution, which, in case of soil or plant samples requires digestion, a time-consuming and error-generating operation.

These limitations were exceeded by the specialists from Analytik Jena, whose equipment, ContrAA 700 represent a major breakthrough in the area, introducing the

concept of High Resolution Continuum Source Atomic Absorption Spectrometry (HR-CS AAS).

The novelties of this modern device are: a high-intensity xenon short-arc lamp as continuum radiation source, a high-resolution double echelle monochromator as spectral sorting device, and a charge coupled device (CCD) array detector, providing a resolution of ~ 2 pm per pixel (Vale et al. 2001, Welz et al., 2007).

Among the major advantages of the system are:

- an improved signal-to-noise ratio due to the high intensity of the radiation source, resulting in improved photometric precision and detection limits;
- secondary lines can be used without compromises;
- new elements might be determined, for which no radiation source has been available;
- the entire spectral environment around the analytical line becomes 'visible', giving a lot more information than current AAS instruments;
- the CCD array detector allows a truly simultaneous background correction close to the analytical line (Weltz et al 2003, Vale et al. 2006).

MATERIAL AND METHOD

Instrument

For determination of cadmium in solid state Miscanthus stems we have used a ContrAA700 Analytik Jena equipment (High Resolution Continuum Source Atomic Absorption Spectrometer) with SSA600 automatic solid sampler (single tray – 42 positions). The atomization cell was purged with argon. Starting from the data provided by the manufacturer, after several attempts, there were determined the best conditions for the analysis (method development), including the graphite furnace temperature program (Table 1). Wavelength was chosen for the secondary line of 326.1055 nm, not the 228nm principal one, in order to eliminate any interference and scattering effect, and a reading time of 5 seconds was set up.

Table 1. Graphite furnace temperature program

Step name	Temp. (°C)	Ramp (°C/s)	Hold (s)	Time (s)	Argon washing	Additional air injection
Drying	120	10	20	28.0	Max	Stop
Drying	150	10	20	23.0	Max	Stop
Drying	200	10	10	15.0	Max	Stop
Ash	350	25	45	51.0	Min	Max
Ash	430	15	45	50.3	Min	Max
Ash	600	15	20	31.3	Min	Max
Pyrolysis	600	0	10	10.0	Max	Stop
Pyrolysis	650	30	10	11.7	Max	Stop
AZ (auto zero)	650	0	5	5.0	Stop	Stop
Atomization	2100	1200	5	6.2	Stop	Stop (read)
Cleaning	2500	500	4	4.8	Stop	Stop

To reduce the organic matrix influence for cadmium analysis, ashing with addition of air (0.5 L/min) was used.

Reagents

The equipment was calibrated starting from a 1000±5 mg/L Cd CertiPUR solution from Merck, diluted in a 0.5% HNO₃ solution. These standard solutions were obtained from ultrapure concentrated Merck HNO₃ and ultrapure water (TKA Smart2Pure, 0.055µS/cm). To stabilize Cd analyte thermally in the pyrolysis stage and to make the other elements in the sample more volatile to facilitate separation Cd from the matrix it was used a 0.1% Pd(NO)₃ solution (Merck), as modifier (Resano et al, 2008). Class A volumetric glass flasks were soaked in a 10% HNO₃ solution for 24 h, then rinsed with ultrapure water and dried. Eppendorf adjustable pipettes (2-20 µL) were used.

Calibration

Calibration was made using 50,100 and 400 µg/L Cd standard solutions, of which 10-20 µL were added in the graphite platforms, respectively. In each platform there were added 10 µL of modifier - 1% Pd(NO)₃ solution. For zero-point it was

used the 1% HNO₃ solution, with modifier. The calibration points, after addition of standard solutions have represented 1.0, 1.5, 2.0, 4.0 and 8.0 ng Cd, respectively.

Analytical procedure

Stems and leaves from a *Miscanthus sinensis x giganteus* culture, established on a very polluted soil in Copsa Mica, were collected in April 2009, in HDPE bags. In the laboratory they were oven dried at 105°C, for 2 h, and cut into small pieces, with a stainless steel lancet and then grinded under 10µm (Fritch – Pulverisette 0). Small stem pieces were brought into a graphite boat, then automatically weighted. After addition of 10 µL of modifier, every sample was introduced into the graphite furnace and analyzed.

The equipment performs three sets of measurements for each sample (weight and absorbance), automatically calculating the average values and the standard deviations. At the end, diagrams showing the absorbance and result tables are generated.

RESULTS AND DISCUSSION

The aim of our work was to determine the amount of heavy metals in plants cultivated on soils polluted with heavy metals, in order to give farmers a chance for the sustainable use of their land. For this reason, we have chosen a plant that is not yet cultivated in Romania, *Miscanthus sinensis x giganteus*, with very large yields (20 tons per hectare and year), and multiple uses, mainly for green energy (Jones and Walsh, 2001). Because only stems are used, we have focused our attention on these.

The results of the analyzes, including Standard deviation (SD) and Relative standard deviation (RSD) are presented in Table 2.

Table 2. Cadmium concentration (µg/kg, d.w.) in *Miscanthus* stems.

	Concentration (µg/kg)	Absorbance	Cd mass (pg)	SD	RSD
Sample 1	1205	0.01042	2057	233.2	19.4

Sample 2	1625	0.01417	1812	502.4	30.9
Sample 3	2686	0.02258	5039	1060	39.5
Sample 4	1490	0.01303	3518	1059	71.1
Sample 5	2518	0.02152	2855	1285	51.0
Sample 6	2992	0.02528	4101	1054	35.2

As it may be seen, the amount of Cd in the analyzed stem is about 2.1 ppm, a very low value considering the soil load (14.5 ppm Cd), this enabling us to recommend the cultivation of Miscanthus on these type of soils.

Considering that the analysis, including calibration took less than 40 minutes, and the amount of Argon used was 25 L, we consider that for these kind of samples can be accurate and efficient analyzed using this method.

CONCLUSIONS

Even though we have started using the ContrAA 700 equipment only recently, we can conclude that high-resolution continuum source atomic absorption spectrometry is a fast, reliable and efficient method for direct analysis of solid samples.

ACKNOWLEDGEMENTS

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**SURVEY REGARDING WATER QUALITY COMING FROM
DIFFERENT SOURCES (FOUNTAINS, SURFACE) USING THE
GLX DEVICE**

MOISE CRISTINA, PAVEL BIANCA-PETRONELA

“Lucian Blaga” University of Sibiu

INTRODUCTION:

Sampling of water is a very important step in the process of monitoring the water, because the samples must be representative and not lead to changes in the composition and quality of water due to inadequate techniques or improper conditions of material preparation.

Water harvesting for analysis is done in phials or polyethylene bottles provided with grinded corks or sealed. Collection vessels should be washed well to remove any organic waste or other impurities which would distort the composition of the sample. The operation of washing is made with a mixture of sulphonic acid and detergent then phials must be rinsed with tap water, distilled and bidistilled water and finally dried.

KEY WORDS: water quality, GLX device.

MATERIAL AND METHOD:

Study on water quality was made with water from various sources in villages, com. Daiesti, com. Vaideeni, sat Fedelesoiu, sat Marița of Valcea county, and the river Cibin of Sibiu County . The obtained data is used to assess the health of the river Cibin and other water sources for consideration.

When sampling , the container will be rinsed 2-3 times with the water which will be sampled then filled with water for analysis to the brim, and the stopper will be fixed so that no air bubbles remain inside the container .

Water source is represented by:

- *fountains*,. in the counties collection bucket is entering at 10-30 cm below the mirror of water, then water is poured into the sample container and those extracted by pumping water samples must be collected after pumping for 10 minutes.
- *Surface waters*, River Cibiru,. Sampling is done by fixing the container to a special support that gives the necessary weight to readily penetrate below the water. Sampling is done by the water stream where it is deepest, upstream from any influence of any affluent and downstream, where the mixture is complete between the receiver and the affluent;

The Water quality indicators used in the analysis are:

- Dissolved oxygen
- pH
- temperature
- conductivity
- pH

Equipment and materials:

- Xplorer GLX •
- Water quality sensor with electrodes for pH, •
conductivity and dissolved oxygen
- Stainless steel temperature sensor •
- Labels •

Assembling the GLX device:

1. Entering the water quality sensor at the top of the device. Connecting the pH electrodes, conductivity and dissolved oxygen in water quality sensor (Water Quality).
2. Insert the stainless steel temperature indicator on the side of the device.
3. From the Home screen, press  to open the Data Files. Use the arrow buttons ( ) to light the folder Flash, select the folder Flash (press ) , use the arrow buttons to light and then open the folder (press F1) configuration called "06 Water Quality CF"

4. 4. Open the image Digits (press , then  and ).

1. Determination of pH, conductivity and dissolved oxygen
2. Insert the temperature sensor in a water sample. Make sure it does not touch the sides or bottom of the container.
3. Gently stir the water with a rod or other device. Continue to gently shake while recording values
4. Press the Start / Stop () to start recording values. After the reading has stabilized, press the Start / Stop to record value.
5. Sign the Digits values displayed on screen in a data table similar to one displayed below.
6. Repeat steps 1-4 using the row electrodes of pH, conductivity and dissolved oxygen.

Note:

- Make sure that the storage phials of pH and dissolved oxygen electrodes are removed. Avoid touching the ends of the electrodes.
 - Make sure that the tip of the conductivity and dissolved oxygen sensors are submerged at least 6 cm, but not touch bottom of the container
7. Repeat steps 1-5 for the next test.

8. Remove all the 4 sensors. Enter back into bottles for storage electrodes for pH and dissolved oxygen.

RESULTS REGARDING WATER QUALITY ANALYSIS:

Water quality indicator

Table 1

No.	pH	Temperature (oC)	Dissolved Oxygen (mg / l)	Conductivity (S / cm)	Date
Proba1	8,63	19,8	6	840	31.10.2009
Proba2	8,12	20,06	6,6	827	30.10.2009
Proba3	8,42	20,59	7,8	394	31.10.2009
Proba4	8,71	20,37	6,8	158	29.10.2009
Proba5	8,30	23,27	6,6	100	30.10.2009
Proba6	8,51	21,45	7,7	100	31.10.2009
Proba7	8,65	20,92	7	100	29.10.2009
Proba8	8,58	21,53	7	100	31.10.2009
Proba9	9,16	22	8	29	31.10.2009

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THE PROTEOLYTIC ACTIVITY IS ONE OF THE FUNDAMENTAL PHYSIOLOGICAL CHARACTERISTICS OF LACTIC BACTERIA

MOISE GEORGE*

*“Lucian Blaga” University of Sibiu

ABSTRACT

The proteolytic activity is one of the fundamental physiological characteristics of lactic bacteria which reflects the intensity of protein scission and the accumulation of the decomposition products.

*We followed the evolution of the protein, nonprotein, ammoniacal and aminic nitrogen induced by *Lactobacillus delbrueckii* spp. *bulgaricus*.*

KEYWORDS: proteolysis, aminoacids, nitrogen, ammonia, lactic bacteria

INTRODUCTION

The nitrate substances from milk represent the most complex and valuable part, being components with highest nutritive value.

Acid dairy-produce represents an excellent source of protein, calcium, phosphorus and some vitamins. In many occidental countries, milk and acid dairy-produce assures 60-70 % from total necessary calcium of the organism.

Part of these nitrous substances, 80 % (the caseins) found out in the shape of complex high-molecular, containing also a part of mineral, through the inclusion of calcium and phosphorus in micellar structure. The nutritive value of lactate products is improved due to modifications suffered by proteins.

Also the dielectric properties of lactate products are conditioned by the favorable act about the human organism of lactic microflora: lactic heterofermentative bacteria and also metabolism products.

The proteolytic activity of lactic bacteria think over the scision intensity of proteins and decomposing products accumulation of these. With how much he is elder the proportion of nonprotein nitrogen, is more active protein decomposing. To the appreciation of bacteria pure culture there is a very large possibility to obtain identical data on photolytic activity and different data for products content.

This is explained probably through the fact as the lactic bacteria own a big set of protein-hydrolase (protease) whom properties chage from one to another pure culture.

They were initiated a series of works carry had right aims the settlement main in aminoacid composition variation. Between aminoacids, respectively the peptides free of by lactic bacteria from caseine, a part are assimilated by growing bacteria, another part are decomposed in other products and what remains is dissolved in milk serum. Therefore, the spectra of free aminoacids wich can be measured in one moment, in a lactate product, is not identical with aminoacid composition of milk protein, it represent the difference between scision aminoacids and aminoacids necessary of bacteria.

EXPERIMENTAL PART

In this paper was followed the modification of milk proteins determinated by lactic bacteria: *Lactobacillus delbrueckii ssp. bulgaricus*. The evolution of nitrate and tartness fractions was observed during 6 days.

Material and method

They were used selected pure cultures of *Lactobacillus delbrueckii ssp. bulgaricus*.

The pure culture was sustained through pasages made in low fat milk sterilized 20 minutes at 110 °C.

In order to folowing the lactic bacteria capacity to scision and hydrolyze the proteins, were determined next parameters: total nitrogen, proteic nitrogen, nitrogen from aminoacids, amonia nitrogen and tartness, at different levels of time.

- total amonia of inseminated milk was determined through Kjeldahl method, and proteic nitrogen was dosed through colorimetric method with Amido Schwarz 10B;
- nitrogen from aminoacids, was determined through method improper called „titration wit formol” by variant elaborated by Schwartz și Key;
- ammonia nitrogen, respectively amonia which was born from proteic substances, through hydrolysis and desaminations, was separated through distilation and volumetric determination, with an sulphuric acid titrated solution.

RESULTS AND DISCUSSIONS

Table 1

The evolution of nitrogen content on fractions and milk tartness inseminated with

Lactobacillus delbrueckii ssp. Bulgaricus

No.	The indicator	Duration (days)					
		Initial	1	2	3	4	6
1	Total nitrogen (mg N/100 g product)	531,43	531,24	531,05	528,20	528	527,63
2	Proteic nitrogen (mg N/100 g product)	505,50	482,92	481,27	472,72	472,53	472,15
	% against total nitrogen	95,12	90,904	90,626	89,496	89,49	89,48
2	Nonproteic nitrogen (mg N/100 g product)	25,93	48,32	49,78	55,48	55,47	55,47
	% against total nitrogen	4,879	9,095	9,373	10,50	10,505	10,513
	Percentual increasing pertain to initial value	-	186,34	191,97	213,96	213,92	213,92
4	Aminic nitrogen (mg N/100 g product)	22,477	29,07	30,21	28,68	28,68	28,31
	% against total nitrogen	4,229	5,472	5,688	5,429	5,431	5,361

	Percentual increasing pertain to initial value	-	129,33	134,40	127,59	127,59	125,95
5	Amonia nitrogen (mg N/100 g product)	2,66	5,035	6,365	10,241	10,14	7,98
	% against total nitrogen	0,5	0,947	1,198	1,938	2,015	1,51
	Percentual increasing pertain to initial value	-	193,65	239,28	385	381	300
6	Tartness g lactic acid /100g product	0,171	0,873	1,124	1,467	1,483	1,510

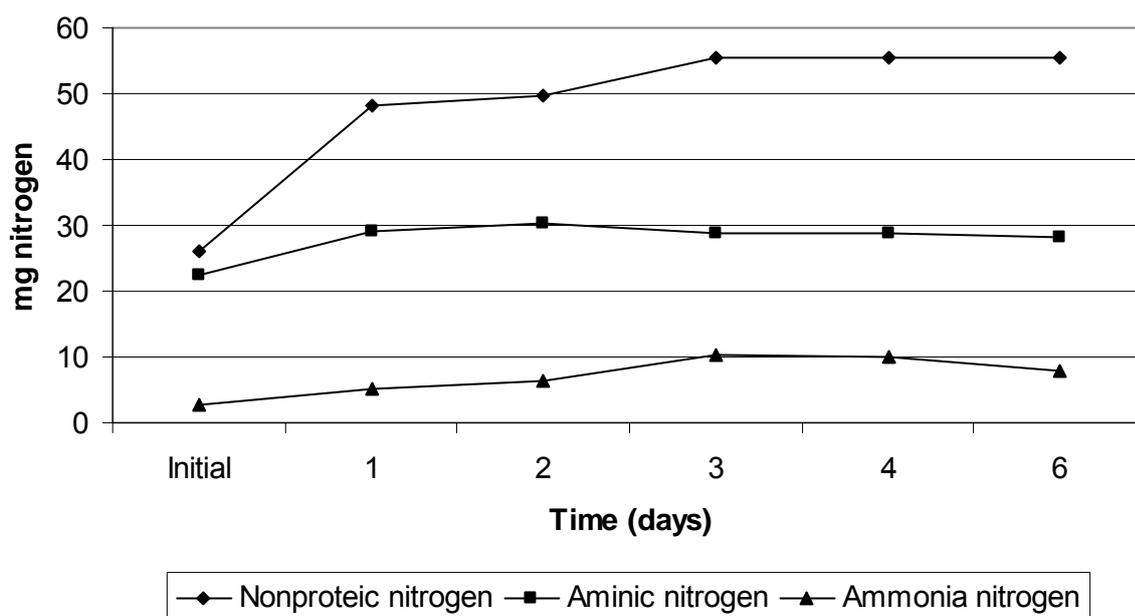


Fig. 1. The evolution of nitrogen content on fractions on milk inseminated with *Lactobacillus delbrueckii ssp. bulgaricus*

The evolution of nitrogen content on fractions and milk tartness inseminated with *Lactobacillus delbrueckii ssp. bulgaricus*

The results obtained for the tartness dynamic and nitrate substances from milk, determined by *Lactobacillus delbrueckii ssp. bulgaricus* are reproduced in table 1 and figure 1 and 2.

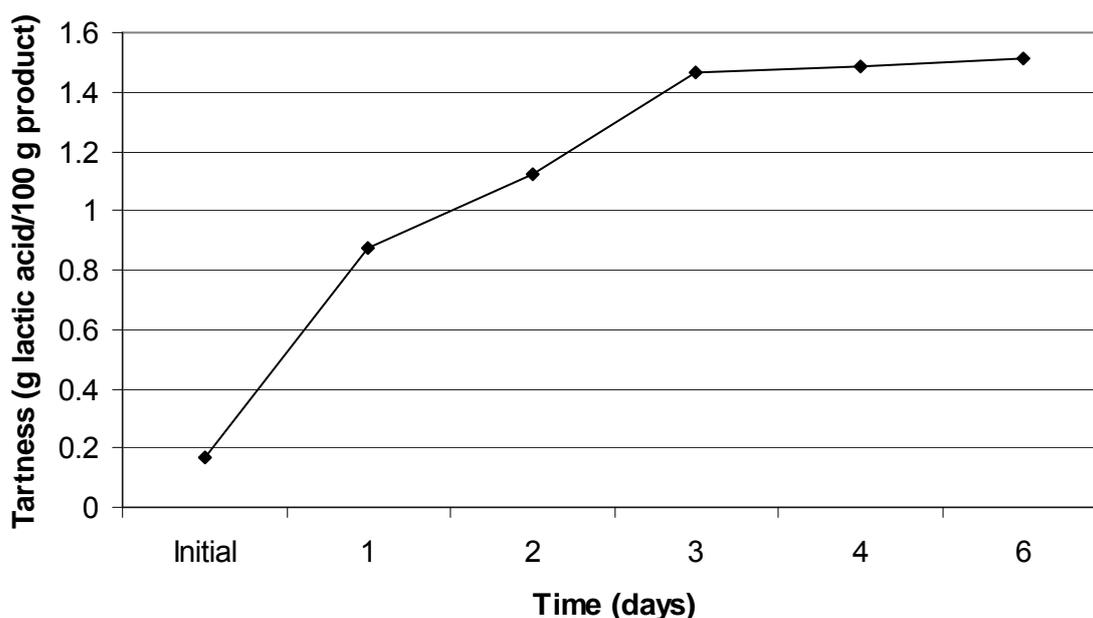


Fig. 1. The evolution of tartness on milk inseeded with *Lactobacillus delbrueckii ssp. bulgaricus*

As is observed in table 1 the most quantity of lactic acid is obtained in first 24 hours. Maximum tartness by 1,467 g lactic acid/100 g product, is obtained beyond 3 days, and then tartness level increase very little.

Due to it *Lactobacillus delbrueckii ssp. bulgaricus*, the proteic nitrogen content is decreasing from 505,5 mg % N in initial milk, to 472,15 mg % N beyond 6 days. The most decreasing is observed in first 24 hours, then in next 5 days the decreasing is more little.

Parallel with proteic nitrogen decreasing, is observed the increase of nonproteic nitrogen due to increasing level of nitrogen from aminoacids and amonia nitrogen.

According to table 1 and figure 1 we observe an continuous increasing of nonproteic nitrogen. As we see, from initial concentration 25,93 mg nitrogen/100 g product, the nonproteic nitrogen represent 10,513 % from total N.

Aminic nitrogen increase from 22,477 mg N/100 g product to 30,21 mg N/ 100 g product, for 2 days, and then a little decreasing.

The free aminoacids nitrogen increasing represent 134,4 %, and beyond 6 days 125,95 % vis a vis initial value. It reduction can be the consequence of these

transformation in decarbonization and desamination products or their metabolisation by product microflora.

In what looks ammonia nitrogen was registered an increasing from 2,66 mg % nitrogen to 10,241 mg % nitrogen beyond 3 days, then consisted a little decreasing.

So, due to *Lactobacillus delbrueckii ssp. bulgaricus*, through proteolytic enzymes which own then, nitrogen substances with high molecule are decomposed in albumose and peptone to aminoacids. The highest decomposing of the protein is in first 24 hours, and then the dynamic is slowly.

This more advanced proteolysis demonstrated through more accentuated decreasing of proteic nitrogen and an powerful increasing of nitrogen from aminoacids and an ammonia nitrogen.

CONCLUSIONS

Lactobacillus delbrueckii ssp. bulgaricus have a proteolytic activity dignified through increasing of nonproteic nitrogen, this represent 10,513 % from total nitrogen beyond 6 days.

The highest decomposing of protein is in 24-48 hours, characterized also through increasing of aminic and ammonia nitrogen.

The made lactic acid can be considered as preservation agent which prevent the high proteic distribution

With tartness increasing, the optimal pH is overdone and proteolytic enzymes are inactivated.

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**USE OF ELECTRONIC INFORMATION RESOURCES IN
UNIVERSITY'S EDUCATIONAL SYSTEM IN THE CONTEXT
OF THE KNOWLEDGE SOCIETY DEVELOPMENT IN
ROMANIA**

PURDOIU LETIȚIA *

* University of Agricultural Sciences and Veterinary Medicine Bucharest

SUMMARY

The Information and Communications Technology - ICT development, has caused nowadays the changing of the traditional library concept that serves inside the institution in higher education, by diversity of products and services for information and documentation, offering to the library users, a good access to the electronic information resources.

The functions of the University's Specialized Library are entailed by the necessities of the users' community to whom it belongs to – students, professors, researchers – the documentary function here being essential. In this regard, the development of the collections, and mostly, the electronic resources, is one of the most important activities in the University's Specialized Library, which a primordial mission: the orientation, the study, the bibliographic and documentary notification, the research, inside the university.

KEY WORDS: information resources, digital library, electronic publications, data basis

**I. Aspects of the information / knowledge society development in
Romania, within a Europe of knowledge**

The question of making the information / knowledge society, throughout Europe, was raised explicitly in 1994 by *Bangemann Report - Europe and the global information society. Recommendations for Council of Europe*, as a response to the American challenge launched by U.S. Vice-President, Al Gore, promoting the

Information Highway concept¹. Once launched this comprehensive process of construction in the European area, many forces were engaged in carrying out strategic programs, projects, concrete directions for action to solve major problems, the technological ones, in competition with the United States, and initializing the building process of the information society as a knowledge society in Europe.

The Bangemann Report fact (June 1994), profiling the information society throughout Europe, had surprised many European countries; at that time there were considerable differences in terms of communication infrastructure, the electronics industry, which were on different development stages in Union's countries, with members and countries aspiring to membership, which could not consider such a challenge, due to domestic economic and social problems faced at that time (economic decline, unemployment, inflation, etc.). However, their governments have done a quick assessment of benefits and losses that may be induced by the creation of information society, the postponing of this process or choosing to not build that society, overall development plan, of each country. Many European countries have realized that European Union plans on building the information society, benefiting from new information and communications technologies may be the best answer to solving socio-economic internal problems faced at that time.

Currently all European countries have run internal strategies for the construction and development of the information society, more or less synchronized with the European Union's one, because of the gaps discussed above, regarding the human resources, economic, and financial potential of each country, and initial conditions of engagement in this complex process of construction.

Requirements and conditionalities of this shaped European framework determined in Romania also the removing of the stagnation mechanism, being manifested the political will of the Government to work towards building the information society. Based on the *eEurope+ 2003 - An Information Society for All*

¹ Translation and interpretation from English - *autostrada informațională* or *autostrada informației* - are being treated as a concept with a strong technical and technological trait, based in that time on U.S. progress in electronics and communications field.

program, which was formally adopted by the *European Summit* held in Gothenburg (June 2001), as a complement to the *eEurope+* program (June 2000), prepared for European Union member states, it was developed in our country the *National Strategy for Information Society development and implementation of knowledge based economy*, in a broader collaboration between government representatives, academics and academia, civil society and business representatives.

An important milestone preceding the government decision was the *National Strategy of the Ministry of Communications and Information Technology*² for the transition to information society drawn up in April 2001; this strategy implements plan *eEurope+* objectives, mentioned above, in specific courses of action, provides prospects for the development of Information society in Romania, and thus its integration into the European information society.³

There were established at executive level the following main objectives for creating the information society in Romania, supported by projects conducted under the coordination of government, regarding *lifelong education and training*, facilitating wider access to the Internet, facilitating access for citizens and companies to government services, promoting e-commerce⁴ and other directions:

- Modernization of Administration and public services
- Improvement of the quality of life through the use of *information technology in the fields of health, education, environment, transportation;*
- Information Technology* sector development;
- Workforce Development for the Information Society;
- Adaptation of *education system and development of digital content.*

Academia and research institutions in our country, in the new light of knowledge society development, have been launched in a synergistic collaboration

² Ministry of Communications and Information Technology is specialized executive body of the central government in communications and information technology that made the Romanian Government policy in this area.

³ National Strategy for the Ministry of Communications and Information Technology for the transition to information society in Aprilie 2001. <http://www.mcti.ro/index.php?id=111&=0>. Accessed: 10.10.2008.

⁴ Idem

with public institutions of the state, companies, citizens, when developing new knowledge, dissemination and application of them, where *intellectual investment in skills development* is a primary goal.

Developing information and communications technologies, in the context of knowledge society development, in our country, have produced and will continue to determine trends and significant changes in the institutions that have as main functions *information and documentation*, so that policies and adopted strategies developed by them have taken approaches to quality management. In such a framework, university libraries, the specialized ones, use of the remodeling of the management system, the redefinition of all internal processes proper for infodocumentary specific structures so that they can achieve synchronization, an adequate approximation of the continuous process of change and society's evolution. The development process of information / knowledge society in our country, induced a current favorable for the development of new concepts, applications, projects, in university specialized libraries, new challenges have emerged, the constructive meaning of the word, outlined the new perspectives of development of these structures based on the fact that the principal vector of human progress is the intelligence and human knowledge.

II. ICT⁵ approach of infodocumentary university structures

An analysis of events performance in years beginning this millennium, reveals indeed that *science*, and hence *scientific research*, is inherently knowledge system vector, which is in a continuous development, and also the main factor of progress and prosperity. In this context, and in our country, for infodocumentary university structures, cultural institution of the library, it is necessary to assume an increasingly active role in the deployment of process of education and research in higher education institutions. This view of development of libraries serving higher education institutions through their formative and informative functions performed within

⁵ Information and Communication Technology

specific user communities, is the only rational option for adaptation and survival in an information environment that become extremely competitive, where entities interact synergistically as strongly interdependent.

Today, in higher education system, of scientific research, area of transformations and trends, the university library, the specialized one, issues from library science perspective, must be reviewed, redesigned to set new direction for development and adaptation to the requirements derived from requirements and directions of development of the knowledge society, developed in the European area in the Bologna Process launched in 1999 by signing the Bologna Declaration by 29 European countries, including Romania, and also by signing the Lisbon Declaration in 2000, which initiated the building process – proposed to be closed by 2010 - of European society relying on knowledge.

Also in our country, the cultural institution of the library in general, particularly libraries serving higher education institutions, acquire new facets as regards training, information and resources that are recovered in the processes of learning and research. I mean in this sense new opportunities of information digitization in relation to current information and communications technologies in continuous development, which determines the definition and development of a new concept, namely, the informational behavior of information structures professionals but also of beneficiaries of infodocumentary services.

Today, specialists in library and information science, a multidisciplinary scientific field, are united by the common codes in the reception and dissemination of information process, which runs using a specific information filter that is the principle of *selective dissemination of information* (SDI) introduced for the first time in 1976, in the Atkinson report which promotes the concept of university libraries with limited collections,⁶ constructed through processes of acquisition subject to scientific hardship.

⁶ REGNEALĂ, Mircea. *Studii de biblioteconomie*. Constanța: Ex Ponto, 2001, p.215.

Developing information and communication technology (Information and Communication Technology – ICT) has led today transforming traditional library concept by diversifying the information and documentation products and services, facilitating user access to information on electronic media. Thus arose the concept of digital library (Digital Library - DL), a library that eliminates the difficulties related to: publications storage space, number of copies and distribution of documents. In this context, personnel specialized in the development of university library collections, to be seen both in terms of training and that of experience, has a mission that is difficult to predict, which is to anticipate and ensure the information needs of community users it serves.

II.1 Infodocumentary structures Consortia - the best way to acquire Electronic resources

An advantageous way to acquire new types of information and documentation services and electronic information resources, represents a *consortium of libraries*, which by association of several libraries, joint purchase of electronic information materials taking advantage to the share. Electronic purchasing consortia fits in an optimal way for academia, which promotes the idea of making a particular education an elitist one. The purpose of these consortia is to serve for the procurement of necessary financial resources, as for the optimal exploitation of resources provided by creditor universities.⁷ Infodocumentary electronic materials that can be acquired by library consortia are:⁸

- ▶ Database;
- ▶ Electronic journals;
- ▶ Full-text information materials.

Modern information and documentation services provide ways to access a large variety of electronic information resources, databases, which today have

⁷ KELLER, Alice. *Consortii în biblioteci: o inițiere practică*. Cluj-Napoca: Presa Universitară Clujeană, 2003, p. 18.

⁸ Tuula Haavisto. Accesul la resursele electronice: aspecte privind licențele în biblioteci. In: *Biblioteca: revistă de bibliologie și știința informării*, nr. 8-9, 2001, p. 282.

diversified from the reference, bibliographic, full-text to multimedia and their applications in University libraries led to an improvement in the degree of satisfying the information needs of the community of users served.

II.2 Electronic Information Resources Management

Today, development and acquisition of information materials in electronic form led also to the development of another type of management (Electronic Resources Management - ERM), which consider and analyze the following aspects of library processes on electronic information resources:⁹

- ▶ The unplanned impact of electronic resources *over processes of library through frequent change of content displayed on a website;*
- ▶ Inappropriate budgets *that can not keep up with rising prices of electronic serials, the high costs of subscriptions requiring a balance between prices required by vendors and quality information;*
- ▶ Small number of specialists in the field, *ready to manage collections of electronic resources, relative to current ICT technology development;*
- ▶ Real competition with other sources of information – *providers of on-line information undertake even more traditional role of the library on the acquisition, processing and delivery of information resources by a public eager for knowledge and leisure;*
- ▶ Beneficiaries' expectations anticipation - *in this respect is necessary the continuous improvement of quality library services, beneficiaries claiming access to information anytime and anywhere, to support distance learning - e-learning -, virtual working groups, and library contribution on specialized literature.*

⁹ CONGER, Joan E. *Collaborative Electronic Resource Management: From Acquisitions to Assessment*. Westport, London: Libraries Unlimited, 2004, p. 1-2.

CONCLUSIONS

1. Developing *information and communications technologies* has led today to change the traditional library concept by diversifying the products and information services, facilitating user access to information on electronic media;

2. Issues of open access to scientific information is already a global concern, not only an academia and scientific preoccupation, in this regard, the issue of providing equal opportunities for *access to information and knowledge* in an academic environment, it is necessary;

3. University, specialized, libraries, in higher education institutions they serve, can diversify their services and informational resources to offer to the community of users, by expanding the electronic resources field and through its own digital initiatives;

4. Electronic information resources, in addition to continuous availability, offer to registered users on the ground of library member status, the simultaneous availability of these resources also outside the library and the university campus;

5. The use of *electronic information* provides a feedback from users, libraries via specific embedded systems that have, by analyzing the files of services can make statistics containing data on numbers, times, locations of access, therefore viewing use frequency of these electronic resources, in fact, the general interest to electronic information resources;

6. The information resources section, in a library, remove difficulties related to: publications storage space, number of copies and distribution of documents;

7. Information security contained in electronic resources can be obtained by using appropriate software, which gives the desired levels of accessibility, for copyright, to protect intellectual property.

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STEPS TOWARDS IAS & US-GAAP CONVERGENCE

SIMTION DANIELA, LUCA ROXANA

ABSTRACT:

Taking into account the trend of globalization, companies want to apply a uniform accounting system. IASB and FASB have closed an agreement to perform together a new conceptual accounting framework. The controversy standards (rules) based on principles or rules is not only a confrontation between the European and American area of thinking, but even among specialists on the same side of the Atlantic.

KEY WORDS: IAS, US-GAAP, convergence, national and international.

Contemporary developments in accounting are marked by three phenomena: standardization, harmonization and internationalization.

Nowadays there are more and more constraints towards national accounting in favour of a field alignment, resulting into the creation of a modern accounting system.

Single market concept is based on phenomena such as the creation of multinational companies, internationalization in economics and culture. It requires an almost identical legislation in each different state.

International harmonization/convergence in accounting is considered to reduce disparities between national accounting rules.

Accounting normalization is the process of blending the presentation of the summarizing documents, accounting methods and terminology, taking into consideration three fundamental goals:

- obtaining a homogeneous information about the company;
- validating accounting information by external users (comparison over time and space);
- contributing to a better allocation of financial resources of a the country.

Harmonization/convergence of international accounting is the process through which rules or national standards that differ from country to country, sometimes divergent, are improved to be comparable.

Harmonization/convergence is different from normalization, which first involves all rules to be uniform. It allows the removal of the main obstacles in achieving international comparisons. The main argument in favor of harmonization is the search for efficiency in international transactions. Lack of uniformity and comparability of accounting information is an obstacle for international investments.

A second motiv leading to harmonization/convergence of accounting systems is the desire to unify the conditions of competition between countries. A summary of the phenomena and issues that can be considered as causes that are leading to the need for harmonization/convergence in international accounting are :

(1) a strong increase and globalisation of economies;

(2) user requirements of financial statements (resulting from the first factor). In this sense we will consider the uniformity of the economic language and also an instrument of accounting disclosure;

(3) enlargement of the European Union;

(4) globalization of capital markets. The trend of growth and globalization of business activities caused a large number of acquisitions from foreign companies. This led to an increase in their financial needs, coming finally to the development of international capital markets.

Taking into account the trend of globalization, companies want to apply a uniform accounting system. In a first stage they aspire to an efficient economic system. The leaders of these companies reach an optimal convergence between internal systems and external information. For multinational companies the requests for compliances coming from users are very important.

In market economy, accounting harmonization/convergence and normalization are covering the organization's operating rules for the market accounting information in order to optimize financial communication.

Accounting information can be viewed as a specific "legal" product because the production, presentation and diffusion must be regulated. Optimizing financial communication means controlling the quantity-quality/price report, in terms of accounting information.

Accounting harmonization/convergence and normalization are necessary because of the economic agents diversity which helps defining supply or demand for accounting information and because of the imbalances that may exist between supply and demand.

In order to prevent these imbalances, the nominators, in their capacity as referees of the accounting game must find solutions to lower the inherent "the use" of the organization's accounting system.

The fundamental question of accounting harmonization/convergence is also related to the credibility note given to accounting. The claim is based on the confidence level of users towards the same public company, for the same period in different countries having different images of the size of equity and outcomes as a result of compliance with the rules of those countries.

Among the above mentioned, harmonization/convergence of international accounting represents a positive phenomenon whose realization is determined by current developments in the economic life in general and accounting in particular.

But, like any process, accounting normalization has some limits of applicability, based on the following issues:

- against harmonization/convergence it can be shown that it breaks social balances, it does not take into account the specific role of accounting in each country. Realising it essentially involves costs undertaken by SMEs, while most of the benefits go to large companies;

- another issue is that of defining/determining the space in which the harmonization/convergence will manifest, if it shall take into consideration all companies or limit itself to some, especially listed companies, capital companies or those with more than a certain threshold;

- for some companies, harmonization/convergence involves significant costs. A change in method can change the image of the company's financial condition and therefore will require informing the user accounts about the effects produced by these changes. Internally the company supports training and information adaptation costs. In general, accounting costs are relatively more important for small companies than for large ones, because these latter may allocate these costs (partially fixed) on a larger number of transactions.

Harmonization/convergence can not be fully achieved unless the social and economic environment exists (tax legislation, company law, financing arrangements, company management systems).

IASB and FASB have closed an agreement to perform together a new conceptual accounting framework. The project launched by the two international standardization bodies, does not cover the complete restoration of the conceptual framework as a reference matrix for accounting, but to update some of its architectural elements and integrate relatively new concepts which have appeared in standards like the fair value.

Countries that have adopted the conceptual framework are mostly English speaking countries: United States, Canada, New Zealand, Australia, United Kingdom of Great Britain and Northern Ireland. However, attempts and achievements have appeared in countries with traditional legislative and centralized accounting approaches (Germany, Japan, France etc.).

In connection with the unique framework there should be noted that representative regulators of the whole world work on this new image of the accounting constitution so that based on it global standards for financial reporting based on principles can be developed.

The exponential growth of the complexity of the standards and the fact that they were based, in many cases, on rules raises concerns. We are seeing an avalanche of new economic and financial reasoning, whose origin is in the nature of reflected operations. It appears as an urgent necessity to derogate from principles, in particular

circumstances. Reluctant behavior is being shown towards exercising professional judgement, in the context in which disputes and scandals are quite present on both sides of the Atlantic. Increasingly present are voices that demand the development of standards based on principles rather than rules. This change in standardization logic is also being driven by the regulation represented through the U.S. Sarbanes-Oxley Law, which came after Enron's and WorldCom's bankruptcies and revitalized the debate on the extraterritoriality American right, because it covered all investment firms and mutual funds, registered with the Securities (whether they were quoted or not).

The law contains numerous provisions aimed to regain the market's confidence.

Returning to the standardization accounting issues, SEC representatives said that above all, it is important, the standards are to be based on an improved conceptual framework. In its traditional form, the concept was not always a comprehensive guide for regulators.

Some conceptual frameworks, such as the international body, Framework for preparation and presentation of financial statements, and Chapter 1000 of the ICCA Manual (the Canadian Framework), Conceptual Fundamentals of financial statements is based on concepts developed by the U.S. regulating body. Essentially, however, FASB conceptual framework is no longer reflecting the evolution of the business-world. Moreover, some parts of the existing frameworks (not only the U.S.) are incomplete or evidence a lack of internal consistency. An example of inconsistency is given by any framework that does not address, adequately, the choice to use tax assessment on items recognized in financial statements.

Current period shows that the two major international regulators appear to have different referential logic:

- For Europe (default referential IAS/IFRS, adopted by most countries including the United Kingdom) one answers a number of principles, in their name, auditors may invite a company to correct accounting assessments, it is stated that the

asset manipulation, which occurred in the Enron scandal, could not be accepted by auditors in some countries;

- In case of the U.S.A. one must respond to an exhaustive list of rules: indeed the U.S. GAAP means a work of about 140,000 pages and answers most of the interpretation questions, but an accountant with the creative accounting sense will find however, a possibility to resort to cosmetics.

The controversy standards (rules) based on principles or rules is not only a confrontation between the European and American area of thinking, but even among specialists on the same side of the Atlantic.

Reproaches were brought to the accounting standards, particularly the U.S. ones, because they contain too many rules and not enough principles, where a too high complexity of these rules and an attempt to adjust their operations in order not to resort to embarrassing rules.

The action of cultural factors is a key enabler in the analysis of social systems change. Culture influences both norms and values of these systems, but also the behavior within groups being in interaction inside and within relations between systems.

Differences between national accounting systems are often described as cultural differences. This qualification can lead to confusion, since it implies the need for different accounting systems from one country to another.

We may agree however that no country possesses a set of accounting rules that is unquestionably worth being adopted worldwide. No country can claim that it has a perfect accounting referential. The United States is the country which has the longest tradition within accounting standardization. It has the largest body of accounting standardization, characterized by a very high level of professionalism. But even U.S. accounting rules have compromises between different interests, compromises that could be decided differently. Entering the details of these rules, it is found that few of the "compromises" are far from unanimous among Americans accountants.

No nation has the right, based on existing achievements, to be considered dominant in matters of accounting. Representatives of different countries still have much to do to reach a level of global compliance. In order to be effective, this giant effort should be continued by the IASB. He gained his legitimacy by joining representatives efforts of many countries and by appealing to strict international procedures.

Today more and more constraints manifest within national accounting in favour of a comprehensive field alignment and resulting in creating the modern system of accounting.

Directive IV concerns the structure, content and presentation of the annual financial statements balance sheet, the profit and loss account and explanatory notes. Directive VII concerns drafting, publishing and controlling the consolidated accounts. Directive VIII refers to the rights and obligations of authorized persons to audit financial statements.

These directives are recommended to the Member States, and they are obliged to implement them into their national legislation.

At first these directives were viewed favorably, then were criticized by some areas of the European accounting world. Professors Prost and Klee from CNMA Paris, in an article entitled 'Invisible face of the European Accounting Directives' reveals the fact that in their application there are many obstacles to overcome, such as:

- (a) language barriers;
- (b) national traditions;
- (c) management and information techniques;
- (d) the game options related to the principles for drawing up, evaluating, presenting and publicating financial statements.

The most important barrier appears to be the language one regarding the concept of 'true and fair view' which is reflected in national accounting legislation of

all EU countries in various meanings, oscillating between a dual and a unified expression.

The accounting system of a country is, as we might recognize a social construction dependent on the nature of society and its development. Beyond this accounting gene, the system of a country depends on the emergence of particular phenomena, and the exchanges it is developing with other countries. We are almost convinced that large enterprises of one country, large groups and multinational companies are attracted by the magnet of globalization. What is sad however is that SMEs have little chances not to be crushed under this huge mixer. It is, perhaps, the only hope to find accounting oasis on economic and social level in which to breathe the air and peculiarities of national culture.

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**THE INFLUENCE OF PRECIPITATIONS UPON THE
HYDROLOGIC PHENOMENA OF CIBIN HYDROGRAPHIC
BASIN**

SPÂNU SIMONA *, ȘTEF IULIAN **,

*Ph.D., Lecturer, University “Lucian Blaga” of Sibiu

Faculty of Agricultural Sciences, Food Industry and Environmental Protection

**hydrologist S.G.A. Alba

ABSTRACT

This paper aims first of all to analyse the periods with precipitations surplus and deficit in Cibin hydrographic basin, in a causal liaison with the synoptic situations that generate floodings or droughts, but also the effect they have on the geographic environment.

Atmospheric precipitations are the source of water supply for the soil. In the case of torrential precipitations, where a high quantity of precipitations intervenes during a relatively short period of time, the superficial flow is great. This fact allows the water to get very quickly in the river and to determine a sudden increase in the debit. In the case of small receiving basins from the mountain region, where the flow regime is very much influenced by precipitations, the high intensity rain showers often cause catastrophic floods.

KEYWORDS: precipitation, hydrologic phenomena, balance of water, geographic environment, climatical characteristics.

INTRODUCTION

Precipitations are the main natural source of water supply in Cibin hydrographic basin. The complexity of the factors that determine the regime of precipitations imprints the studied area with special climatic characteristics that have an impact on the geographic landscape. The ensemble and unitary analysis highlights the relations that are being realized between precipitations and the other components of the geographic environment and underlines the local hallmark of Cibin

hydrographic basin. This aspect makes the object of the second part of this study that shows the effects of the pluviometric regime on the geographic environment of Cibin hydrographic basin. The major imbalances that are being generated on the environment by the excess of precipitations or, on the contrary, by the lack of precipitations, justify the interest of climatologists for these phenomena. This analysis has in view both the direct, determinant effect of precipitations on the components of the geographic environment, and the indirect effect, favouring or limitative, induced by precipitations.

1. GENERAL CONSIDERATIONS

The geographical position of Cibin hydrographic basin leaves its mark on the ensemble climatical characteristics, the area being situated both in the mountain climatical region (the high region of the Cindrel Mountains), and in the plateau climatical region (Sibiu Depression and Hârtibaciu plateau).

Among the geographical factors, the relief has the most important role. As a climatogene factor, the relief is imposing through altitude, versants exposure, slope and the configuration of its forms.

The altitude determines the modification on the vertical of all the climatical elements.

The atmospherical precipitations increase as the altitude increases, up to a certain height, called pluviometrical optimum, beyond which they begin to decrease. The differences that occur between the quantities of precipitations registered in the Sibiu Depression and the Hârtibaciu Plateau are due to the frontolysis, as a result of the foehn effect, the frontogenesis and the intensification of the continentalism effect.

The versants exposure imprints differentiations between the Southern versants, which receive lower quantities of precipitations, as compared to the Northern ones, where the precipitations quantities are greater. The versants that are sheltered from the general atmospherical circulation (the Eastern versants) receive lower quantities of precipitations, as compared to the Western ones.

The inclination of versants has an important role in the differentiate warming of the surfaces with different slopes, thus the role in the repartition of the precipitations quantity. The configuration of the relief determines the modification of the climatical elements. In the concave forms (depression, valley lanes) there are frequent temperature inversions, the frost persists, the wind is lower, and the precipitations are reduced. In the convex forms (crests, peaks), the wind speed gets higher, as well as the orographic convection, having significant implications in increasing the quantity of precipitations.

Cibin hydrographic basin is a dynamic system, its particularity deriving from the connection of characteristic elements such as:

- *the overlapping of the Cibin hydrographic system over three distinct relief units*, respectively mountain, plateau and depression, aspect that reflects directly in the precipitations regime;

- *the remarkable variety of the relief* (depending on the lithology, structure, tectonics), which is reflected in the differentiate action of the precipitations, as exogenous modelling agent;

- *specific topoclimates* that characterize the different units of Cibin basin which are traceable in the variation of the climatic parameters in general and the pluviometric ones in particular.

2. THE INFLUENCE OF THE DYNAMIC CLIMATOGENE FACTORS

The ensemble analysis of Cibin hydrographic basin has as purpose the prominence of the unity and at the same time the individuality of the precipitations regime, but not under the aspect of uniformity and unalterableness, but on the contrary, analyzed both in terms of the pronounced diversity of manifestations, with orographical, hydrological, biogeographical, ecological, socio-economic impact, and as a result of the relationships that are being formed between precipitations and the different components of the geographical environment.

That is why the analysis of precipitations implies the reference to all other geospheres, taking into consideration the interferences and interactions between them, within determinable limits.

The interest for the study of climate in the areal of Cibin hydrographic basin has been materialized in numerous works, beginning with the XIXth century. Under the conditions in which the pluviometric surplus or deficit become risk factors, their study and the study of the effects they have on the natural and socio-economic environment is fully entitled. The climatologists have the role of analyzing these risk phenomena, taking part in the identification, limitation and prevention of the negative effects of floodings and droughts. Through the modernization of the research methods and the introduction of the computerized methods of data processing, studies regarding the atmospheric precipitations are being realized with the help of general or specific statistical methods.

The climate of Cibin hydrographic basin is determined, as in any other area on the globe, by three climatogene factors: radiative factors, dynamic factors and physico-geographical factors. The territorial differentiations of the solar energy parameters are caused by latitude, by the general orientation of the great relief forms and by altitude. The Carpathians, through their spatial positioning and the versants exposure, differentially receive and transform the solar energy, and through the orientation up against the general circulation of the air masses they represent barriers that are difficult to overcome.

The dynamic climatogene factors are represented by the general circulation of the air masses and the baric centres that operate over Europe. The analysis of the synoptic situations allows the identification of atmospherical characteristics that are favourable to the accumulation of the precipitations surplus or deficit. In the analysis of the precipitations regime, a determinant role is played by the normal synoptic conditions, respectively by the atmospheric circumstances that favour the dry or rainy regime.

3. THE INFLUENCE OF PRECIPITATIONS UPON THE HYDROLOGIC PHENOMENA OF CIBIN HYDROGRAPHIC BASIN

Cibin hydrographic basin is an area exposed to deluges and floodings due to the excess of precipitations. The greatest deluges occur in the spring, when on the background of the increase in the quantity of precipitations, temperature escalation also intervenes, triggering the melting of the snow layer. Still, most of the deluges occur at the end of spring and beginning of summer. Cibin hydrographic basin is sheltered from deluges and floodings neither during the winter, these being determined by the amplification of the circulation of cyclonic air masses of oceanic and mediteranean nature. Except for the autumn months, when the air circulation is predominantly anticyclonic, through the rest of the year deluges and floodings might occur, generated by the excess of precipitations.

Among the vegetation forms, the forest is the one that most influences the climatic elements and phenomena. The forest is a complex ecological system, between the elements of which interdependence reports are being created. The forest influences the precipitations that fall over it through the duration of retention and drainage and through the regime of humidity created inside the forest.

Atmospheric precipitations are the source of water supply for the soil. In the case of torrential precipitations, where a high quantity of precipitations intervenes during a relatively short period of time, the superficial flow is great. This fact allows the water to get very quickly in the river and to determine a sudden increase in the debit. In the case of small receiving basins from the mountain region, where the flow regime is very much influenced by precipitations, the high intensity rain showers often cause catastrophic floods.

Water is a component and a structuring agent of the environment through volume, an agent bonding the environmental components through its circuit in nature, a circulation agent with a wide spread at the level of the geosphere, so it is the most dynamic component from the set of the physical components. When precipitations fall on the surface of the soil, part of them is retained by the vegetation, and another

part reaches to the surface of the soil. When precipitations exceed the infiltration rate, the water surplus is centralized, generating the surface flow.

In winter, on the background of the penetration of warmer masses of air, oceanic or mediteranean, precipitations that take the form of snowfall occur. But most often, the winter represents a minimum in the flow of the rivers of Cibin hydrographic basin. If the air and soil temperature has positive values, the precipitations take the form of rain. At the same time, the increase in the air temperature determines the melting of the pre-existent snow layer.

In spring, the water resulted from the melting of snow is added to the one resulted directly from precipitations and contributes to the increase in the debits on the rivers of Cibin hydrographic basin. This aspect is obvious for the interval March-April in Sibiu Depression and Hârtibaciu Plateau and is shifted to April-May in Cindrel Mountains.

In summer, the convective currents determine the rapid rise of air, the forming of Cumulonimbus clouds, and the generation of shower precipitations. Successive sequences of strong rain showers determine the increase in the debit and level of rivers from the mountain region, the reactivation of torrents, and the flow towards lower areas of a significant quantity of water.

In autumn the debits are lower, because the weather is stable most of the time, and rain showers seldom occur. At Sadu and Sibiu hydrometric stations, autumn participates with a percentage superior to that of winter, because the presence of numerous tributaries from the mountain region determines a flow regime with a primary minimum in winter and a secondary one in autumn.

It can be noticed a correspondence between the great quantity of precipitations (Fig. 1 left) and the increases in debit, especially during the warm interval of the year (Fig. 1 right).

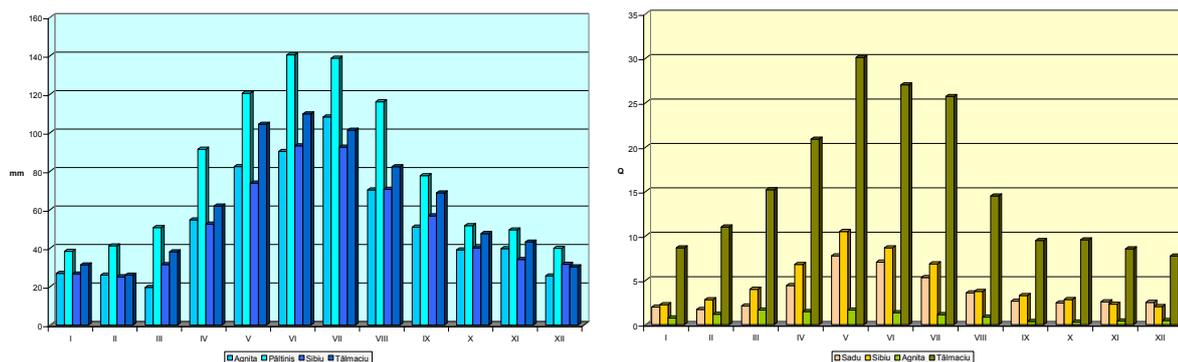


Fig. 1. Precipitations variation (left) and average debit variation (right) in Cibin hydrographic basin in the interval 1961-2006

The main supply is the pluvial one, to which the nival one is added, followed by the subterranean supply. According to the classification of supply sources, the pluvio-nival one predominates in most of Cibin hydrographic basin, more precisely in the lower mountain region, in Sibiu Depression and Hârtibaciu Plateau. The nivo-pluvial supply characterizes the rivers from the mountain region (Fig. 2).

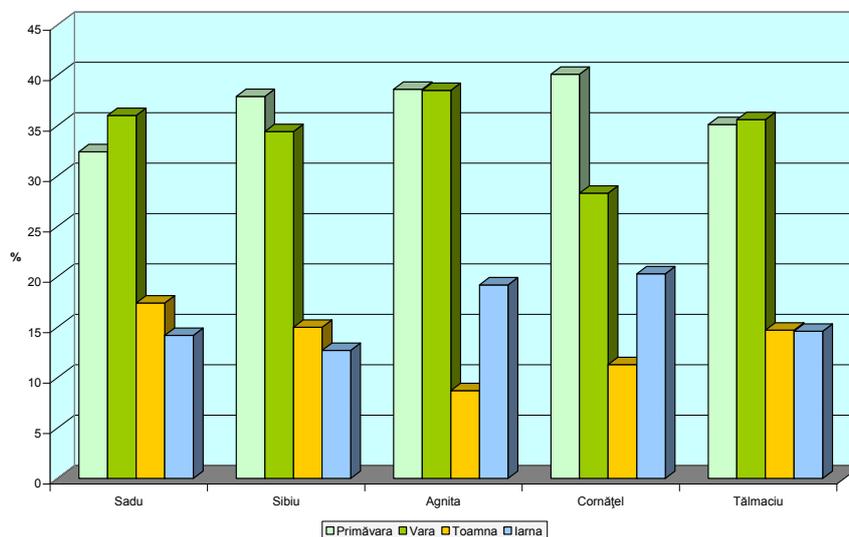


Fig. 2 Distribution according to seasons (%) of the average debits in Cibin hydrographic basin

CONCLUSIONS

Most of the rivers in Cibin hydrographic basin are characterized by the pluvio-nival type with moderate subterranean supply. The rivers that are characterized by

this type of supply have high waters is March-April, followed by a series of floods in May and June. The rivers from the mountain area are characterized by the nivo-pluvial type with moderate subterranean supply.

The rivers from this category have high waters in April-May, followed by floods during the summer, usually in June-July. In the Southern part of Hârtibaciu Plateau, the moderate type of pluvial supply with moderate subterranean supply is present.

In the flow of the rivers that are characteristic to this type, high waters occur in spring and in summer there are also frequent high waters, floods generated by successive rains. Sometimes floods also occur in autumn, with a greater frequency than for the other types.

In Cibin hydrographic basin it can be noticed the gradual transition from the Transilvanian carpathian type to the Transilvanian pericarpathian one. The direction of the transition is from West to East, in the same direction with the increase in the degree of continentalism.

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ASSESSMENTS OF THE GOALS AND STRATEGIES IN DEVELOPING OF MOUNTAIN AGRICULTURE AND CONSERVATION OF CULTURAL LANDSCAPES

STANCIU MIRELA*, SAND CAMELIA*, CIORTEA GLIGOR*,
SĂVOIU GHEORGHE**

*"Lucian Blaga" University of Sibiu, **University from Pitești

ABSTRACT:

Mountain area occupies about 1 / 3 of the surface of our country. Difficult to access for agricultural modernization, the mountain area has remained largely a cultural landscape as a whole ecosystem formed by human interaction with nature over the centuries.

Led hard lives of the mountain and lead to his leaving.

The work was estimated economic weight of the three major branches of mountain agricultural economy (forestry, animal husbandry, fish farming).

There was said the main types of economic activity of the population (own-called farmers, agricultural workers, farmers partly non-agricultural occupations).

Distinguish the following types of mountainous area (zoo-fruit-growing, agro-forestry, tourism, industrial).

The major objective of agricultural policy is to maintain the mountain population, settlements, cultural landscape and establish possible strategy for achieving this goal (the development of viable farms, turistico-industrial development, maintaining medium-term partial farmers, conservation of historical and cultural landscape).

Key words: mountains, strategies, objectives, farmers, durable development

1. Assessments on the reality of life in mountain area

Agriculture includes, in the broadest sense of the term, crop production (including forestry) and animal by man in place by modifying the action of natural selection and environmental factors.

Forest is a component of the agriculture and rural life. Geographic mountain is a matter of altitude.

Agricultural and sociological is but a matter of relief, slope, reducing the share of arable land thus reduce a major part of human subsistence crop production goods needed to close to zero.

In effect, mountain agriculture and includes so high and rough hills.

Low share of arable land has resulted marginalization of mountain agriculture in recent decades in terms of collectivization, but also scientific assistance. This apparently earned some socio-economic and environmental benefits compared with lowland villages.

1.1. Features mountain farming

The statistics for household private producers in the period prior to 1989 and data acquired by the Agency mountain areas, allowing highlighting several features of mountain farming, not in our intention to examine the substantive issue.

The territory of the mountain region occupies about 1 / 3 of the country's area (73 970 sq. km). From this forests occupy 54% and 40.5% other agricultural concerns.

Forestry needs to be actively involved in socio-economic problems of mountain areas. It should be noted that in the not too distant past, the forest was not too separated from the pasture (Bunce).

The land used for agriculture itself is predominantly occupied by pastures and meadows (71.5%), which would mean that the economic place to place second in mountain farming is animal husbandry.

Low production of pastures and especially small production, difficult and expensive winter feed, reducing the share of animal husbandry for most mountain areas of the country, except the 4 major centers of transhumance and a very favorable growth areas in the fields Dorna and Ciuc, Where the competition in the high hills is fruit growing.

With a weight of approx. 15% of the population, the mountain produces approx. 29% of fruit generally poor commercial quality (40% apples, plums 30%, 38% nuts), approx. 22% of potatoes, about 20% of the milk, approx. 16% of beef cattle and sheep, but only about 7% of the grain (1986 data).

Agricultural production in the mountain area is so affected by:

- lack of arable land, caused by terrain, but the occupation of the cities and leaving the terraces;
- the imbalance between the carrying capacity of livestock production during the summer and winter, on account that can be placed on the source of transhumance and transterminanței (the short transhumance: winter -home to the farm, somer - in the mountains).
- using only manual work required by the relief thus achieving an expensive production;
- small size of operation, providing only partial subsistence holder, a very small agricultural income, what should work in another field, peasant farmers are partial, partly professional.

1.2. Socio-economic assessments

Today it is estimated that in different mountainous areas of the country, but also a change inside the area, there are the following types of economic activities of people:

- a) exclusive of subsistence farmers, with the lowest life (approx. 1 / 12 of population);
- b) farmers employed professionals (pastors about. 1 / 12 of population);

farmers - owners of agricultural inputs (animal-Mocan, land Fruit), which provides an income level competitive with the average salary (about 1% of the population);

employees, forest workers, industry, services (tourism), trade, trade, but farmers in part (1 / 2 ... 1 / 6 of income, approx. 5 / 6 of the rural population of the mountain);

employees - mostly urban population of the mountain.

1.3. Mountain-range of important agricultural areas of cultural and nature conservation

Some systems of agriculture, generally extensive, with low input-low output, which have developed hundreds of years by the interaction between man and nature have, as the European Forum Stresses Conservation and Pastoralism (Bingal, 1996) show, have a great value for nature conservation and culture. They are called cultural landscapes (Bunce). IUCN is already concerned about the issue of establishing a red card of them. Our mountain area is largely a set of cultural landscapes to be preserved and possibly restored.

Cultural landscapes are threatened today by the abandonment of pastures, in some places by the urbanization, tourism and even intensified agriculture. Is needed also in Romania in particular an interdisciplinary collaboration between biologists and specialists in animal husbandry-agronomists, in terms of nature conservation.

Reserves and natural parks with an area of over one million hectares and inside them are not accepted, as in other countries (Hungary, etc.) livestock. Note that in Denmark 90% of natural grassland used by farmers are part of nature reserves.

2. Development objectives of mountain agriculture

Mountain farming, should contribute, along with other services (small industry, forest, tourism, etc.) to the retention of population in mountainous areas mainly in villages, at rural development, through:

- achieving a higher income per hectare than it can provide the forest in the grassland area, and ensure a food production goods to people of the country;
- directing the first forest plantations to areas most exposed to erosion;
- use pore Alpine, protecting soil from erosion and provide labor for the forest;
- protection of cultural and historical artifacts and even national economic as transhumance, some specific forms of agriculture, construction, etc.

As a distant goal must target the development of the class of farmers (sheep or cattle breeders, fruiter) professionals, to achieve their income only from agriculture production by freight delivery. The farm size - normal size (England and Scotland approx. 40 ha) could increase by restricting areas and protection forests and alpine privatization goals.

Short and medium term is inevitable and useful to maintain households by 1 / 2 ... 1 / 6 agricultural income, which in future may become land for hobby farming, mostly on the slope.

The villages which are cultural-historical and even cultural landscapes should be identified and protected by special economic measures by the state.

Recommended agricultural technologies should be aimed at maximizing the mountain area of economic efficiency, even if it may mean production extensification.

3. Considerations of alternatives in mountain agricultural development strategy

Mountain agricultural production can evolve spontaneously to the objectives pursued in so far as they correspond to historical economic and social imperatives. Evolution is less expensive material and human if supported “from above” by an appropriate strategy.

Strategy, routes followed and the means used in the development of mountain agriculture, is a part of the paradigm agro-mountain, all the principles and methods devoted mountain climbing namely rural development.

It has a component generally applies to all types of agricultural areas and a mountain in country-specific component areas.

General ways of reaching the mountain agricultural development seems to be:

a) Increasing family size commercial farms by mountain area at least 6-10 cows initially, 100-200 sheep and land properly, to ensure at least one owner family farm income equivalent to the average salary;

b) Given that land is not sufficient for all farmers to become commercial farmers, who live in farm income is necessary absorption of available jobs or left available services (tourism, etc..), forestry, small industry developed mountain area. It should also be possible to maintain the current farm and 1 / 2 full-time work or partial subsistence.

c) Maintain and develop the current system of organization of summer grazing (associative or antrepenorial) the short transhumance (village-mountain) or flocks, animals that small subsistence farms and ½ time work are organized in large herds and goes in pastoral in summer by professional usually in small groups “farmers” or moving winter in lowland arable areas.

d) Discouraging expansion of settlements on relatively flat land that can be worked mechanized and possible return to agriculture on terraces;

Weaving and not isolation of agriculture by forestry and livestock production, primarily through the development of livestock and crops of fruit bushes, in addition to culture of wild animals and harvest spontaneous;

f) better collaboration between the Ministry of Environment and Ministry of Agriculture, generally between biologists and farmers in nature conservation issues;

Development of the present system of vertical integration of professional shepherds (production, processing, sales) by organizing bodies upgraded integration upstream (supply) and downstream (industrialization, disposal of products) the firm, possibly with the cooperation of farmers.

Stimulating progress on the proposed routes are made by some general means such as:

- Act to prevent further division of land, purchase or inheritance by those who are not qualified to be farmers;
- Leasing to farmers in the long term or sell the common property alpine pastures;
- Revision of the protection zone of forest and selling funds available to farmers, which is to protect and forest;
- Stimulation of economic incentives to the emergence of units under the association or the state of supply, industrialization (dairies, cashier, etc) and disposal of livestock farms and horticultural products;
- Solving technological problems (optimal size of farm, mining optimization technologies, etc..) by research institutes;
- Objectives, ways and means must be diversified general on major types of economic zones mountains that seem to be:
 - a) predominantly agricultural areas, isolated by industrial centers without major forestry operation in general area of cultural landscapes;
 - b) agro-forestry areas;
 - c) areas with heavy tourism;
 - d) areas of industry, agriculture, forestry, tourism.

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