INFLUENŢA FERTILIZĂRILOR CHIMICE ASUPRA PARTICULARITĂŢILOR DE FRUCTIFICARE LA VIŞIN

INFLUENCE OF CHEMICAL FERTILIZATION ON SOUR CHERRY FRUITING PARTICULARITIES

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Abstract
In line with the development of fruit growing competitive nationally and internationally, to obtain high yields of fruit and keeping balance exobiological was necessary to study new technological sequences. In addition to fruit growing research in advanced countries are moving towards organic and inorganic fertilized with low emission, due to the reduction of manure and chemical fertilizers. In the present experience, use of chemical fertilizers has a complex composition of molecules in 100% of plant and associated trace elements.
Therefore plant uptake is more intense and fast to fertilizers that extra root a slow leaching of chemical fertilizers with regard to the application root.

1. Introduction

One of the concerns of the fruit tree is standing to seek new technologies that will produce high yields in terms of quantity and quality. If sour cherry crop is large enough productive capacity, but dependent by culture system, climatic conditions and agro technologies applied.

Researches aimed at improving nutrition extra root sequence and root supply schemes by studying the trees with a range of new products fertilizing a diverse assortment of sour cherry grown in the NE area of Romania, to ensure a normal supply of trees with macro and micronutrients.

2. Material and method

The objectives of this work, aimed at ensuring state of biological balance between growth and fructification in year 28 after planting a diverse range of sour cherry varieties from different eras namely fruit ripening, pollination behaviour in the process, lines of recovery, growth vigour and specificity of fructification.

The biological material studied in experience included 10 varieties, 4 varieties of cherry foreign (*Northstar, Oblacinska, Schattenmorelle, Engleze timpurii*) and 6 varieties Romanian (*Ilva, Nana, Pitic de Iaşi, Scuturător, Crişana 2, Mocăneşti16*) existing current range and planted according to their vigour.

In both densities was applied agro technique for sour cherries in the crop specific area of the country, except chemical fertilization, that was performed annually, according to experimental variations.

Research has been organized in such a polifactorial experiences AxB, where A factor was the variety with 10 graduations and factor B represented by the four graduations chemical fertilization, resulting in 40 variants.

Experimental variants are the following:

Factor A, variety with 10 graduations:
- ◄a1 - *Northstar*;
- ◄a2 - *Oblacinska*;
- ◄a3 - *Ilva*;
- ◄a4 - *Nana*;
- ◄a5 - *Schattenmorelle*;
- ◄a6 - *Pitic de Iaşi*;
- ◄a7 - *Scuturător*;
- ◄a8 - *Engleze timpurii*;
- ◄a9 - *Crişana 2*;
- ◄a10 - *Mocăneşti 16*.

Factob B; chemical fertilization, with 4 graduations:
- ◄b1 – extra root fertilization (Ff);
- ◄b2 – extra root fertilization + root fertilization(Ff+r);
- ◄b3 – root fertilization (Fr);
- ◄b4 – unfertilized (N).

Within each variety were marked graduations corresponding plots factor B. In this way, each variety has been made ready in the blocks randomized experience with three repetitions, each repetition contained five trees.

To assess the influence of chemical fertilization on the particularities of fructification were conducted observations, measurements and determinations on the following elements: may bouquet, mixt branch and bent branch (for each of it was numbered vegetative and flowering buds from 50 pcs. branches / tree.

3. Results and discussion

Influence of chemical fertilization on the number of flowering buds on May bouquet sour cherry varieties studied

The number of flowering buds on the may bouquet was oscillate from one variety to another, the limits has been recorded especially for the variants root fertilized and extra root fertilized variants from each variety and from variety Pitic de Iasi variety to Oblacinska variety.

In the ten varieties analyzed the average number of flowering buds of May bouquet under the influence of three methods of fertilization. The most effective method of fertilization, in terms of number of flowering buds / branch bucket is extra root fertilization applied in differentiation phenophase combined with root fertilization applied in the spring, and was followed by fertilization with foliar application variant. The lowest effect was obtained when the root fertilization

From Tables 1 and 2 can be seen that the highest number of flowering buds were recorded for the variety Oblacinska (6.8 pcs.) when mixed fertilization was used, and the lowest number of flowering buds were obtained at *Pitic de Iaşi* (3.2 pcs.) in case of medium vigour trees.

If density of 500 trees / ha, the highest number of flowering buds on May bouquet was recorded in Mocăneşti 16 variety (5.8 pcs.) in mixed fertilized variant. Variety Crisana 2 (3 pcs.) was obtain the small number of flowering buds for root fertilization recording positive significant differences from unfertilized witness.

Influence of chemical fertilization on the thickness, length and number of flowering buds on the sour cherry mixt branch at varieties studied

In table 3 and 4 - Influence of chemical fertilization on mixed branch length (cm), shows that the small increase in mixed branch length is obtained for variant root fertilization and the highest for combined variant of fertilization.

Under the influence of chemical fertilization methods can be seen that the thickness of the mixed branches at studied varieties was increased, with the largest increases were obtained when mixed fertilization are used.

Foliar fertilizer application (Ff) made during the growing season for varieties planted at a density of 1250 trees / ha (Table 6. and 7) led to an increase in this indicator of 3.36 mm for the variety Oblacinska, 2, 64 mm for Scuturator varieties and 4.11 mm at Mocăneşti 2 variety, Crisana 16 (4.26 mm) recorded significant positive difference to the witness separately fertilized. Variety that responded best following the application of foliar fertilization was: Ilva (3.05 mm).

The mixed fertilized variant (Fr + r) varieties have been very significant positive differences to unfertilized witness were: Ilva (4.35 mm), Schattenmorelle (4.88 mm), *Pitic de Iaşi* (3.52 mm), *Scuturător* (3.98 mm), Crisana 2 (4.23 mm).

Fertilized root (Fr) resulted in an increase of 3.38 mm statistically assured, at variety *Pitic de Iaşi* and 3.40 mm at Scuturător variety. Northstar cultivars (3.89 mm), Oblacinska (3.31 mm), Ilva (3.75 mm) registering significant differences. For the rest of studied varieties, root fertilization, cannot determine significant increases compared to unfertilized witness.

Analyzing the influence of different fertilization methods at medium vigour varieties can be found that combining the two fertilization has as result obtaining higher number of flowering buds per mixed branch (17.2 pcs. for variety Ilva, 11.8 pcs. at Oblacinska), and extra root fertilization results obtain for variety Ilva a number of 14.2 buds per branch.

Standard root fertilization has led to the lowest values of the number of flowering shoots in the varieties planted at a density of 1250 trees / ha.

Regarding chemical fertilizing applied to large vigour varieties can be seen from Table 8 that the highest values on the number of flowering buds on mixed branch were recorded for combined fertilization variants (Ff + r). The variety who responded best to this method of fertilization was Mocăneşti 16 (23.3 pc). Lowest values were obtained for all variants, normal fertilized, varieties planted at a density of 500 trees / ha.

4. Conclusions

Sour cherry chemical fertilization results in an increase in the total number of buds per May bouquet. The highest value was obtained for mixed fertilization followed by extra root fertilization.

In the ten varieties analyzed, the average number of buds on flowering branch grew under the influence of fertilization methods. The most effective method of fertilization, in terms of number of flowering buds / branch was mixed fertilization. The lowest effect was obtained root fertilization applied in early spring.

Root fertilization resulted in a less significant increase in mixed branch length, variants mixed fertilized has an increased length of the branches, and variants of fertilization extra root yielded average results in comparison with the other variants.

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Tables and figures

Table 1. Influence of chemical fertilization on May sour cherry May bouquet in year 28 after planting (density 1250 trees / ha)

Variety	Chemical Fertilizer / variant	2009				
		Total no. of buds (pcs)	Flowering buds number (pcs)	Relative Nr. bud (%)	+/-d (buc.)	DL (buc.)
Northstar	Ff V1	5,4	4.4	200.00	1.20^{xxx}	DL 5%=0.20 DL 1%=0.40 DL0.1%=0.60
	Ff+r V2	6.1	5.1	231.82	1.90^{xxx}	
	Fr V3	4.5	3.5	159.09	0.30^{x}	
	N (Mt V4	4.2	3.2	100.00	0.00	
Oblacinska	Ff V5	6.2	5.2	147.22	1.60^{xxx}	DL 5%=0.20 DL 1%=0.40 DL0.1%=0.60
	Ff+r V6	7.8	6.8	188.89	3.20^{xxx}	
	Fr V7	5.8	4.8	133.33	1.20^{xxx}	
	N (Mt) V8	4.6	3.6	100.00	0.00	
Ilva	Ff V9	6.1	5.1	159.38	1.90^{xxx}	DL 5%=0.30 DL 1%=0.50 DL0.1%=0.70
	Ff+r V10	6.4	5.4	168.75	2.20^{xxx}	
	Fr V11	4.4	3.4	106.25	0.20	
	N(Mt) V12	4.2	3.2	100.00	0.00	
Nana	Ff V13	4.6	3.6	163.64	1.40^{xxx}	DL 5%=0.40 DL 1%=0.60 DL0.1%=1.00
	Ff+r V14	6.6	5.6	254.55	3.40^{xxx}	
	Fr V15	3.5	2.5	113.64	0.30	
	N(Mt) V16	3.2	2.2	100.00	0.00	
Schattenmorelle	Ff V17	4.2	3.2	145.45	1.00^{xxx}	DL 5%=0.30 DL 1%=0.40 DL0.1%=0.60
	Ff+r V18	4.5	3.5	159.09	1.30^{xxx}	
	Fr V19	3.5	2.5	113.64	0.30^{x}	
	N(Mt) V20	3.2	2.2	100.00	0.00	
Pitic de Iaşi	Ff V21	3.2	2.2	110.00	0.20	DL 5%=0.30 DL 1%=0.40 DL0.1%=0.70
	Ff+r V22	3.5	2.5	125.00	0.50^{xx}	
	Fr V23	3.2	2.2	110.00	0.20	
	N(Mt) V24	3.0	2.0	100.00	0.00	

Table 2. Influence of chemical fertilization on May sour cherry bouquet in year 28 after planting (density 500 pomi/ha)

Variety	Chemical Fertilizer / variant	2009				
		Total no. of buds (pcs)	Flowering buds number (pcs)	Relative Nr. bud (%)	+/-d (buc.)	DL (buc.)
Scuturător	Ff V25	4.5	3.5	129.63	0.50^{xx}	DL 5%=0.30 DL 1%=0.50 DL0.1%=0.80
	Ff+r V26	5.0	4.0	166.67	1.00^{xxx}	
	Fr V27	4.2	3.2	118.52	0.20	
	N (Mt) V28	4.0	3.0	100.00	0.00	
Engleze timpurii	Ff V29	4.5	3.5	129.63	0.50^{xxx}	DL 5%=0.10 DL 1%=0.20 DL0.1%=0.25
	Ff+r V30	5.5	4.5	166.67	1.50^{xxx}	
	Fr V31	4.2	3.2	118.52	0.20^{xxx}	
	N (Mt) V32	4.0	3.0	100.00	0.00	
Crişana 2	Ff V33	4.4	3.4	136.00	0.90^{xxx}	DL 5%=0.20 DL 1%=0.30 DL0.1%=0.40
	Ff+r V34	4.8	3.8	152.00	1.30^{xxx}	
	Fr V35	4.0	3.0	120.00	0.50^{xxx}	
	N (Mt) V36	3.5	2.5	100.00	0.00	
Mocăneşti 16	Ff V37	5.4	4.4	125.71	0.90^{xxx}	DL 5%=0.20 DL 1%=0.30 DL0.1%=0.60
	Ff+r V38	6.8	5.8	165.71	2.30^{xxx}	
	Fr V39	5.0	4.0	114.29	0.50^{xx}	
	N (Mt) V40	4.5	3.5	100.00	0.00	

Table 3. Influence of chemical fertilization on mixt branch length sour cherry in year 28 after planting (density 1250 trees / ha)

Variety	Chemical Fertilizer / variant	2009			
		Mix branch length (cm)	Relative average length (%)	+/-d (cm)	DL (cm)
Northstar	Ff V1	22.26	127.43	4.82^{xx}	DL 5%=2.62 DL 1%=3.91 DL0.1%=6.30
	Ff+r V2	25.11	143.43	7.62^{xxx}	
	Fr V3	18.66	106.86	1.22	
	N (Mt V4	17.46	100.00	0.00	
Oblacinska	Ff V5	19.61	129.80	4.56^{xx}	DL 5%=2.45 DL 1%=3.74 DL0.1%=5.97
	Ff+r V6	19.82	131.13	4.77^{xx}	
	Fr V7	16.80	111.26	1.75	
	N (Mt) V8	15.05	100.00	0.00	
Ilva	Ff V9	25.72	129.80	5.94^{xxx}	DL 5%=1.14 DL 1%=1.73 DL0.1%=2.82
	Ff+r V10	27.36	138.38	7.58^{xxx}	
	Fr V11	21.22	107.07	1.44^{x}	
	N(Mt) V12	19.78	100.00	0.00	
Nana	Ff V13	15.18	136.94	4.05^{xxx}	DL 5%=1.03 DL 1%=1.54 DL0.1%=2.41
	Ff+r V14	18.04	162.16	6.91^{xxx}	
	Fr V15	11.95	108.11	0.82	
	N(Mt) V16	11.13	100.00	0.00	
Schattenmorelle	Ff V17	16.52	148.65	5.38^{xx}	DL 5%=2.55 DL 1%=3.84 DL0.1%=6.11
	Ff+r V18	20.55	185.59	9.41^{xxx}	
	Fr V19	15.62	140.54	4.48^{xx}	
	N(Mt) V20	11.14	100.00	0.00	
Pitic de Iaşi	Ff V21	17.32	135.16	4.52^{x}	DL 5%=3.52 DL 1%=5.43 DL0.1%=8.63
	Ff+r V22	23.19	181.25	10.39^{xxx}	
	Fr V23	16.33	127.34	3.53	
	N(Mt) V24	12.80	100.00	0.00	

Table 4. Influence of chemical fertilization on mixt branch length sour cherry in year 28 after planting (density 500 trees/ha)

Variety	Chemical Fertilizer / variant	2009			
		Mix branch length (cm)	Relative average length (%)	+/-d (cm)	DL (cm)
Scuturător	Ff V25	19.21	172.97	8.13^{xxx}	DL 5%=1.24 DL 1%=1.83 DL0.1%=2.85
	Ff+r V26	21.61	194.59	10.53^{xxx}	
	Fr V27	11.32	101.80	0.24	
	N (Mt) V28	11.08	100.00	0.00	
Engleze timpurii	Ff V29	12.35	125.51	2.60^{xx}	DL 5%=1.42 DL 1%=2.25 DL0.1%=3.53
	Ff+r V30	12.72	129.59	2.97^{xx}	
	Fr V31	10.86	111.22	1.11	
	N (Mt) V32	9.75	100.00	0.00	
Crişana 2	Ff V33	19.09	130.82	4.49^{xxx}	DL 5%=0.95 DL 1%=1.44 DL0.1%=2.33
	Ff+r V34	19.84	135.62	5.24^{xxx}	
	Fr V35	15.65	106.85	1.05^{x}	
	N (Mt) V36	14.60	100.00	0.00	
Mocăneşti 16	Ff V37	23.26	120.73	4.00^{xx}	DL 5%=2.02 DL 1%=3.04 DL0.1%=4.90
	Ff+r V38	31.34	162.18	12.08^{xxx}	
	Fr V39	20.22	104.66	0.96	
	N (Mt) V40	19.26	100.00	0.00	

Table 5. Influence of chemical fertilization on the thickness of mixed branch sour cherry in year 28 after planting (density 1250 trees/ha)

Variety	Chemical Fertilizer / variant	2009			
		mixed branch thickness (mm)	relative thickness (%)	+/-d (mm)	DL (mm)
Northstar	Ff V1	3.98	111.11	0.37^{x}	DL 5%=0.33 DL 1%=0.42 DL0.1%=0.75
	Ff+r V2	4.09	113.89	0.48^{xx}	
	Fr V3	3.89	108.33	0.28^{x}	
	N (Mt V4	3.61	100.00	0.00	
Oblacinska	Ff V5	3.36	104.34	0.14^{xx}	DL 5%=0.11 DL 1%=0.18 DL0.1%=0.25
	Ff+r V6	3.42	106.25	0.20^{xx}	
	Fr V7	3.31	103.13	0.90^{x}	
	N (Mt) V8	3.22	100.00	0.00	
Ilva	Ff V9	3.82	105.56	0.18^{x}	DL 5%=0.14 DL 1%=0.23 DL0.1%=0.48
	Ff+r V10	4.35	122.22	0.71^{xxx}	
	Fr V11	3.75	105.56	0.11^{x}	
	N(Mt) V12	3.64	100.00	0.00	
Nana	Ff V13	3.89	105.41	0.17	DL 5%=0.33 DL 1%=0.41 DL0.1%=0.69
	Ff+r V14	4.26	116.22	0.54^{xx}	
	Fr V15	3.76	102.70	0.04	
	N(Mt) V16	3.72	100.00	0.00	
Schattenmorelle	Ff V17	4.59	106.98	0.31^{x}	DL 5%=0.19 DL 1%=0.42 DL0.1%=0.57
	Ff+r V18	4.88	113.95	0.60^{xxx}	
	Fr V19	4.46	104.65	0.18	
	N(Mt) V20	4.28	100.00	0.00	
Pitic de Iaşi	Ff V21	3.45	120.69	0.59^{xxx}	DL 5%=0.26 DL 1%=0.34 DL0.1%=0.57
	Ff+r V22	3.52	123.07	0.66^{xxx}	
	Fr V23	3.38	117.24	0.52^{xx}	
	N(Mt) V24	2.86	100.00	0.00	

Table 6. Influence of chemical fertilization on the thickness of mixed branch sour cherry in year 28 after planting (density 500 pomi/ha)

Variety	Chemical Fertilizer / variant	2009			
		mixed branch thickness (mm)	relative thickness (%)	+/-d (mm)	DL (mm)
Scuturător	Ff V25	3.42	107.21	0.23^{xx}	DL 5%=0.13 DL 1%=0.25 DL0.1%=0.36
	Ff+r V26	3.98	124.76	0.79^{xxx}	
	Fr V27	3.40	106.58	0.21^{xx}	
	N (Mt) V28	3.19	100.00	0.00	
Engleze timpurii	Ff V29	4.08	102.50	0.09	DL 5%=0.11 DL 1%=0.24 DL0.1%=0.31
	Ff+r V30	4.22	105.76	0.23^{xx}	
	Fr V31	4.07	102.00	0.08	
	N (Mt) V32	3.99	100.00	0.00	
Crişana 2	Ff V33	4.11	105.13	0.26^{xx}	DL 5%=0.14 DL 1%=0.23 DL0.1%=0.37
	Ff+r V34	4.23	107.69	0.38^{xxx}	
	Fr V35	4.02	102.56	0.17	
	N (Mt) V36	3.85	100.00	0.00	
Mocăneşti 16	Ff V37	4.26	112.40	0.47^{xx}	DL 5%=0.23 DL 1%=0.32 DL0.1%=0.51
	Ff+r V38	4.34	113.16	0.55^{xx}	
	Fr V39	3.90	102.63	0.11	
	N (Mt) V40	3.79	100.00	0.00	

Table 7. Influence of chemical fertilization on mixed branch buds on cherry in year 28 after planting(density 500 trees/ha)

Variety	Chemical Fertilizer / variant	2009				
		No. total of buds (pcs.)	Flowering buds no. (pcs.)	Average buds. no. (%)	+/-d (buc.)	DL (buc.)
Scuturător	Ff V25	12.5	6.8	147.83	2.2^{xx}	DL 5%=1.00 DL 1%=1.50 DL0.1%=2.40
	Ff+r V26	12.9	7.6	165.22	3.0^{xxx}	
	Fr V27	9.3	4.7	102.17	0.1	
	N (Mt) V28	7.5	4.6	100.00	0.0	
Engleze timpurii	Ff V29	9.1	5.6	147.37	1.8^{xxx}	DL 5%=0.50 DL 1%=0.80 DL0.1%=1.30
	Ff+r V30	9.6	6.5	171.05	2.7^{xxx}	
	Fr V31	8.6	4.6	121.05	0.8^{xx}	
	N (Mt) V32	6.7	3.8	100.00	0.0	
Crişana 2	Ff V33	15.3	7.6	146.15	2.4^{xxx}	DL 5%=0.90 DL 1%=1.40 DL0.1%=2.20
	Ff+r V34	17.2	9.8	188.46	4.6^{xxx}	
	Fr V35	13.3	7.3	140.38	2.1^{xx}	
	N (Mt) V36	9.3	5.2	100.00	0.0	
Mocăneşti 16	Ff V37	18.3	8.2	178.26	3.6^{xxx}	DL5%=0.60 DL 1%=0.90 DL0.1%=1.50
	Ff+r V38	23.3	10.3	221.74	5.7^{xxx}	
	Fr V39	13.4	5.7	123.91	1.1^{xx}	
	N (Mt) V40	9.2	4.6	100.00	0.0	

Table 8. Influence of chemical fertilization on mixed branch buds on cherry in year 28 after planting (density 1250 pomi/ha)

Variety	Chemical Fertilizer / variant	2009				
		No total of buds (pcs.)	Flowering buds no. (pcs.)	Average buds. no. (%)	+/-d (buc.)	DL (buc.)
Northstar	Ff V1	15.5	9.4	118.99	1.5^{xxx}	DL 5%=0.20 DL 1%=0.40 DL0.1%=0.80
	Ff+r V2	19.6	11.3	143.04	3.4^{xxx}	
	Fr V3	12.6	8.1	102.53	0.2	
	N (Mt V4	11.8	7.9	100.00	0.00	
Oblacinska	Ff V5	13.7	10.4	118.18	1.6^{x}	DL 5%=1.20 DL 1%=1.80 DL0.1%=2.90
	Ff+r V6	14.8	11.8	134.09	3.0^{xxx}	
	Fr V7	12.3	9.5	107.95	0.7	
	N (Mt) V8	11.9	8.8	100.00	0.00	
Ilva	Ff V9	18.2	14.2	135.24	3.7^{xxx}	DL 5%=0.90 DL 1%=1.40 DL0.1%=2.20
	Ff+r V10	24.3	17.2	163.81	6.7^{xxx}	
	Fr V11	16.6	13.5	128.57	3.0^{xxx}	
	N(Mt) V12	14.5	10.5	100.00	0.00	
Nana	Ff V13	12.7	8.7	122.54	1.6^{xxx}	DL 5%=0.50 DL 1%=0.70 DL0.1%=1.20
	Ff+r V14	14.4	10.3	145.07	3.2^{xxx}	
	Fr V15	9.8	7.2	101.41	0.1	
	N(Mt) V16	8.6	7.1	100.00	0.00	
Schattenmorelle	Ff V17	18.2	7.2	153.19	2.5^{xxx}	DL 5%=1.00 DL 1%=1.50 DL0.1%=2.40
	Ff+r V18	19.6	9.3	197.87	4.6^{xxx}	
	Fr V19	14.6	6.7	142.55	2.0^{xx}	
	N(Mt) V20	8.5	4.7	100.00	0.00	
Pitic de Iaşi	Ff V21	14.4	8.9	134.85	2.3^{xxx}	DL5%=0.50 DL 1%=0.80
	Ff+r V22	17.3	9.4	142.42	2.8^{xxx}	

	Fr V23	14.1	7.5	113.64	0.9^{xx}	DL0.1%=1.20
	N(Mt) V24	10.3	6.6	100.00	0.00	

Fig.1. *Issues concerning the influence of chemical fertilization on may buquet at Oblacinska* şi *Engleze timpurii* varieties

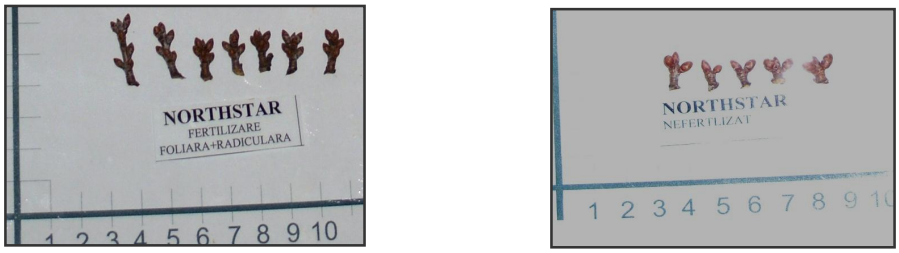

Fig.2 (a). Issues concerning the influence of chemical fertilization on the number of buds per may buquet for the variety *Northstar*

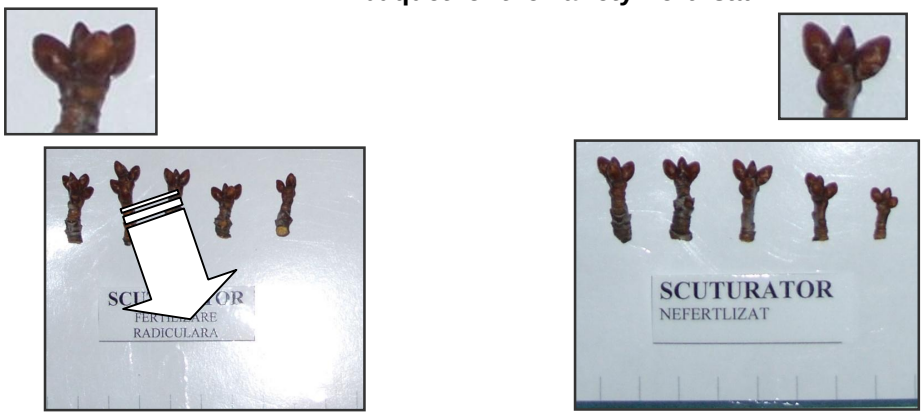

Fig.2 (b). Issues concerning the influence of chemical fertilization on the number of buds per may buquet for the variety Scuturator

Fig.7. (a). Influence of chemical fertilization on mixt branch *Mocănşti 16* sour cherry

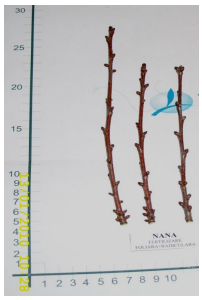

Fig.7. (b) Influence of chemical fertilization on mixt branch *Nana* sour cherry