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The Fertilization Influence on Growth of Apple Shoots

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Abstract. The investigations were made in the orchard of the firm "Zubresti" S.A. established in spring 2003, the tree planting distances are 4 x 2 m. The trees are conducted by the fusiform crown. There have been studied the influence of Urea concentration on the growth of shoots in intensive period of growth in apple tree , at 'Golden Delicious', 'Florina' and 'Idared' varieties grafted on the rootstock M26. We have used the Urea 46% N in concentration from 0.4% to 1.2% in different stages of development of apple fruit. At the end of period of growth of shoots, average length Idared variety in 2009 was at 33.00 cm in control variant up to 49.00 cm in variant 4 or 48% higher than the control variant. In 2010, the difference in length of shoots in 'Idared' variety depending on the concentration of Urea 46 % used: in variant 2 was 12 % compared to the control and up to 39 percent in variant 4.

Keywords: apple tree, rootstock, urea, variety.

INTRODUCTION

Need to supply substances in apple crops is much higher than in other fruit species because this species gave high yields (of tens tons), as determined by the high consumption of nutrients. For these reasons, to provide nutrients consumed by large crops of apples, imposing an optimal fertilization but at the same time rational, does not create antagonisms between different nutrient sand create conditions for normal absorption.

Necessity application who established these plantations were generally low fertility, and on the other hand the large number of trees per unit of urea and production forecast calls for a good supply of fertilizer. After fertilization with urea was observed extra root late fall leaves (Norton and Childers, 1954, Lecce and Kenworthy,1971) and an increase of nitrogen in leaf fall (Kennedy, 1963). Other researchers (Ficher, 1948, Ficher and Cook, 1950, Rodney, 1952, Titus, 1974) after the application of urea fertilization extra root, spring or autumn, in the apple as a replacement or an addition to nitrogen, have been obtained an intensive growth of shoots.

MATERIAL AND METHODS

The investigation made in the apple orchard of the „Zubresti" S.A. firm established with grafted trees two years old near village Zubresti district Straseni in 2009-2010. Established the plantation was done in spring 2003 with 'Golden Delicious', 'Idared' and 'Florina' variety grafted on M 26 rootstock, the trees placement system is 4x2m. Four variants with foliar fertilization were studied (Tab. 1).

Tab. 1

Schedule of experience

Nr.	The period of effect foliar fertilization	Foliage fertilizer concentration			
		V1	V2	V3	V4
Urea 46 % active substance					
1	after blooming (when the 75% where in bloom)	water	0.4	0.5	0.6
2	When the fruit had 10-12 mm in diameter	water	0.7	0.8	0.9
3	When the fruit had 25-30mm in diameter	water	1.0	1.1	1.2
Polyfeed(N19:P19:K19)					
4	When fruits are in the ripen stages (20-30 July)	water	0.1	0.1	0.1
Calcium chloride(CaCl2)					
5	With 20-30 days before harvest	water	0.5	0,6	0,7

The study of the growth intensive shoots was made every 10 days until terminal bud formation.

RESULTS AND DISSCUSION

For two years they have studied the dynamics of growth of shoots. Depending on the specificity of biological variety and concentration of urea 46% applied breast is obtain following results.

The Golden Delicious variety in 2009 at the beginning of the observation period that the lowest average length of shoots was in control variant with 11.50 cm. The foliar fertilization variants see a more intensive shoots from 4% in control form variant 2, and up to 11% in variant 4. In 2010 at the beginning of the observation period the difference in length of shoots of the control variant and foliar fertilization is carried out which was from 53% in variant 2 to 66% in variant 4.

At an interval of 20 days after making measurements, the length of shoots, we see that the length of shoots from control variant had an average length of 21.00 cm, an increase in foliar fertilization version obtain is a maximum average length of shoots in variant 4 with 25.25cm or 23% compared to the control variant.

In 2010 in the same period of difference between infancy significantly increased options for 2009 and up from 26 percent in variant 2 compared to the control variant up to 53 % in variant four.

At the end of the period of increasing their average length of shoot sin 2009 ranged from 27.33 cm in control variant up to 32.33 cm invariant 4. In the other two variants had a length of shoots increased by 4% compared to the control in version 2 and 15 percent compared to the control in version 3.

In 2010 the average length of shoots was also shown best in version4 where the difference in growth compared to the control variant with62% more than average length.

The variety ‘Idared’ the beginning of research in 2009 the average length of shoots vary within 13.75 cm in the control variant, and the largest in version 4 with 15.75 cm or 13% higher than the control variant.

In 2010 in the same period the difference between versions is much higher than in 2009 and is in version 2 with 12% more than in the control variant, and thriving with 25% in April compared to the control variant.

Tab. 2

The average length of shoots depending on the particularities of biological variety and concentration of foliar fertilizers (Rootstock M26, Distance of planting 4x2, S.A. „ Zubreşti“., 2009- 2010)

variant	The average length of shoots, cm.											
	15.05				4.06				25.06			
	2009	% as to control	2010	% as to control	2009	% as to control	2010	% as to control	2009	% as to control	2010	% as to control
‘Golden Delicious’												
1c	11,5	100	9,25	100	21,0	100	24,0	100	27,3	100	25,2	100
2	12,0	104	14,1	153	24,7	118	30,1	126	27,26	104	32,00	127
3	12,2	107	14,2	154	25,3	121	32,5	135	31,5	115	37,0	147
4	12,7	111	15,3	166	25,2	123	36,6	153	32,3	118	41,0	162
‘Idared’												
1c	13,7	100	17,1	100	27,0	100	32,8	100	33,0	100	34,5	100
2	14,1	103	19,1	112	35,2	131	36,3	112	43,0	131	38,7	112
3	15,2	111	20,2	118	35,3	132	38,4	117	42,7	130	41,0	119
4	15.2	113	21,3	125	37,0	137	39,2	120	49,0	148	48,0	139
‘Florina’												
1c	13,0	100	15,1	100	26,6	100	35,3	100	38,7	100	40,5	100
2	13,2	102	16,2	107	30,0	113	37,3	106	39,3	102	45,2	112
3	13,3	103	20,0	132	36,5	137	39,6	112	44,6	115	49,0	121
4	14,0	108	25,2	167	39,3	148	44,8	127	50,8	131	54,0	133

In 2009 in the middle phase of intensive shoots in the control variant was 27.00 cm long shoots, increasing the foliar fertilization variants of 35.25 cm or 31% compared to the control variant up to 37.00 cm in version 4 or 37% more than in the control variant. In variant 3 the average length of shoots was 35.33 cm or 32% more than in the control variant.

In 2010 the average length of shoots increased and amounted to32.82 cm in the control variant, increasing in other variants of 12% compared to the control up to 20% in version 4 where the concentration of urea used was 46% breast 0.6% 0.9% 1.2%.

At the end of the period of growth of shoots, average length ‘Idared’ variety in 2009 was at 33.00 cm in control variant up to 49.00 cm version 4 or 48% higher than the control variant.

In 2010 the difference in length of shoots in ‘Idared’ variety depending on the concentration of urea 46% breast used in version 2 was 12% compared to the control and increased up to 39 percent in version 4.

The variety ‘Florina’ in 2009 the average length of shoots was at13.00 cm in control variant up to 14.00 cm in variant 4 or 8% higher than the control variant. In 2010 in the same period of notice that the difference between foliar fertilization variants is more pronounced and amounted to 7% in version 2 compared to the control up to 67% in variant 4 compared to the control variant. The version 3 length difference was 32 percent of the control variant.

In the meddles of the variety of shoots intensive growth ‘Florina’ in 2009 from their length was 26.66 cm in control variant up to 39.33 cm invariant 4. In other variants the difference in length compared to the control was 13% in version 2 and 37% in version 3. In 2010 the average length of shoots in the same period the year amounted to35.37 cm in the control variant, and most indicate to obtain in version4 with 44.80 cm. In the

other two variants the average length of shoots was 37.30 cm in version 2 and 39.63 cm variant 3.

At the end of the period of intensive growth of shoots in 2009 the average length was 38.75 cm in control variant and the largest inversion 4 with 50.83 cm or 31% more than in the control variant.

In 2010 also the highest average length of shoots was recorded inversion 4 with 54.00 cm or 33 percent more than in the control variant. In other variants the average length of shoots compared with control variant grew 12% in version 2 and version 3 of 21%.

CONCLUSION

At the end of the period of increasing their average length of shoot sin 2009 ranged from 27.33 cm in control variant up to 32.33 cm in variant 4. In the other two variants had a length of shoots increased by 4% compared to the control in version 2 and 15 percent compared to the control in version 3.

In 2010 the average length of shoots was also shown best in version4 where the difference in growth compared to the control variant with 62% more than average length.
In 2010 the difference in length of shoots in 'Idared' variety depending on the concentration of urea 46% breast used in version 2 was 12% compared to the control and increased up to 39 percent in version 4.

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REFERENCES

1. Norton, R.A. and N.F. Childers (1954). Experiments with urea sprays on the peach. Proc. Amer. Soc. Hort. Sci. 63:23-31.
2. Leece, D.R.and A.L. Kenworthy (1971). Effects of potassium nitrate foliar sprays on leaf nitrogen concentration and growth peach trees. Hor. Science 6:171-173.
3. Oland, K. (1963). Responses of cropping apple trees to postharvest urea sprays. Nature 198:1282-1283.
4. Fisher, E. G., D.K. Boynton and K. Skodvin (1948). Nitrogen fertilization of the McIntosh apple with leaf spray of urea. Proc. Amer.Soc.Hor. Sci. 51:23-32.
5. Fisher, E. G. and J.A. Cook (1950). Nitrogen fertilization of the McIntosh apple tree leaf sprays of urea.II Proc. Amer.Soc.Hor. Sci. 55:35-40.
6. Titus, J.S. (1974). Postharvest urea sprays can supply nitrogen to the apple. Trans.III. State Hor.Soc. and III. Fruit council 106:52-53.