Annals of the University of Oradea, Fascicle: Environmental Protection, doi.org/10.5281/zenodo.4362307, Vol. XXXV, 2020
Analele Universității din Oradea, Fascicula: Protecția Mediului, doi.org/10.5281/zenodo.4362307, Vol. XXXV, 2020

ESTABLISHING THE NECESSARY MACRO AND MICROELEMENTS NECESSARY FOR GROWTH AND DEVELOPMENT OF PRUNUS LAUROCERASUS PLANTS CULTIVATED IN CONTAINERS

Vlad Ioana Andra*

*University of Oradea, Faculty of Environmental Protection, Bd. General Magheru, nr.26
Oradea, Romania, e-mail: ioana_andravlad@yahoo.co.uk

Abstract

Ensuring and maintaining a proper supply status in the container substrate with easily accessible nutrients is the basis for obtaining good results in the cultivation of Prunus laurocerasus plants. (Vlad I., 2012). Fertilization is necessary to replace the reserve consumed by plants or leaching, to help restore and improve the condition of the substrate and hydro physical properties, to stimulate the activity of microorganisms involved in the disaggregation of organic substances to increase the content of nutrients easily accessible to plants (Zaharia D, 1993). The requirements of prunus laurocerasus plant compared to nutrients differ depending on soil moisture, plant age, container size and crop substrate (Krussman, 1986).

Obtaining favorable influences in the growth of Prunus laurocerasus plants is also conditioned by the quantitative ratios that are made in the substrate, in the main nutrients (Iliescu, 1994).

Key word: Prunus laurocerasus, containers, fertilizers, culture substrate.

INTRODUCTION

Maintaining the fertility of the crop substrate can be achieved by applying fertilizer doses approximately equal to the annual consumption of Prunus laurocerasus plants and the rate of humus mineralization, and decreasing the fertility of the substrate occurs when the doses of fertilizers used are less than the amount of elements nutrients extracted annually from the culture substrate and the rate of humus mineralization or when no fertilizers are applied (Parnia, 1992).

By applying moderate doses of fertilizers it is possible to ensure not only maintaining the fertility of the soil but also obtaining very good results in plant growth and development (Voican, 1994).

MATERIAL AND METHODES

The experiments took place in Santandrei, Bihor, with the following options:

V1- culture in containers in peat 60% and leaf soil 40%.

V2 - culture in 50% peat containers and 50% leaf soil.

V3 - 40% peat container culture and 60% leaf soil.

The substrates used were neutralized and fertilized with the following doses calculated per m^3 of substrate:

- calcium carbonate 4 kg.
- simple superphosphate 2 kg.
- ammonium nitrate 0.5 kg.
- magnesium sulphate 1.5 kg.
- potassium sulphate 1.5 kg.
- borax 20 g.
- copper sulphate 25 g.
- iron sulfate 50 g.
- manganese sulfate 20 g.
- zinc sulfate 15 g.
- ammonium molybdate 5 g.

The basic fertilizers were mixed powdered with the substrate, and those with microelements were dissolved in water and administered evenly.

RESULTS AND DISCUSSION

In order to achieve a rational fertilization, substrate samples were collected once a month, during April-September, which were analyzed in the laboratory.

The evolution of the content of mineral substances in the culture substrate following the fertilizations performed is presented in table 1.

During the experiment, the content of nitrogen, phosphorus and potassium decreases, due not only to the consumption of plants but also to the leaching of a quantity of water-soluble substances. This made it necessary to maintain the content at optimal levels for all variants (15-30 mg N; 8-12 mg P2O5; 25-40 mg K2O; 8-15 mg MgO).

The doses of fertilizers administered during a vegetation period were 1000kg / ha (300kg ammonium nitrate, 300 kg superphosphate, 200kg potassium sulphate and 200 Kg ammonium nitrate), 800kg / ha for variant 2 and 600kg / ha for variant 3 (96,000 plants containers per hectare).

Table 1.

Results of laboratory tests and fertilizations performed on containers of Prunus laurocerasus grown in containers

Number and date bulletin of analyze	PH water	Mineral content Water soluble (1: 5) mg / 100g dry substrate					Moisture%	Residue mineral %	Fertilizations performed (kg/ha)			
		N	P_2O_5	K_2O	CaO	MgO			Nitrogen by ammonium	Sulfate of potassium	Super-phosphate	Nitro chalk
Variant 1												
1/21 IV	6,9	18	9	29	44	14	67	0,37				
2/19V	6,8	17	8	28	41	13	65	0,35			300	
3/22VI	6,7	16	12	26	39	12	64	0,39				
4/23 VII	6,6	15	11	25	35	11	63	0,37	300	200		200
5/20VIII	6,9	17	10	28	38	10	62	0,42				
6/18IX	6,7	16	9	27	37	9	61	0,38				
Variant 2												
1/21 IV	6,7		10	30	40	13	65	0,39				
2/19V	6,7		10	28	38	13	65	0,35				
3/22VI	6,6		9	25	35	12	64	0,33		200		200
4/23 VII	6,9		8	28	39	11	63	0,38	200		200	
5/20VIII	6,8		10	27	38	9	62	0,39				
6/18IX	6,7		9	26	37	9	61	0,35				
Variant 3												
1/21 IV	7,0		11	31	46	15	64	0,38				
2/19V	6,9		10	29	42	14	64	0,37				
3/22VI	6,8		8	27	38	13	63	0,39	200		100	
4/23 VII	6,7		11	25	35	12	62	0,41		200		100
5/20VIII	6,8		10	28	38	11	62	0,40				
6/18IX	6,7		9	27	36	10	61	0,37				

CONCLUSIONS

In order to ensure a complete and balanced mineral intake for a faster growth and development, the content of nutritious mineral salts and the total concentration, as well as the Ph values, in the substrate of culture. On this basis, stage fertilizations were performed.

The content of water-soluble mineral substances (1: 5) initially has values of 18 mg N, 9 mg P_2O_5, 29 mg K_2O, 44 mg CaO and 14 mg MgO per100 g of dry substrate in variant 1; of 17 mgN, 10 mg P_2O_5, 30 mgK_2O, 40 mg CaO and 13 mg MgO per 100 g of dry substrate in variant 2; 18 mgN, 11 mg P_2O_5, 31 mg K_2O, 46 mg CaO and 15 mg MgO per 100 g of dry substrate in variant 3.

In order to maintain the content of mineral substances at appropriate levels, it was necessary to apply quantities of fertilizers 1.6 times higher in variant 1, where the amount of peat was 60%, compared to variant 3, where peat entered only in percentage of 40%.

Additional fertilization begins with a decrease in the content of water-soluble active substance to 15 mgN, 8 mg P_2O_5, 25 mg K_2O, 35 mg CaO and 8 mg MgO per 100 g dry substrate and was done with doses of 100-300 kg of fertilizers. per hectare a fertilization (1-3 g per plant in a container).

REFERENCES

1. Bergman W.,1992,Nutritional disorders of plants-Developement visual and analyticalDiagnosis, Gustav Fischer, Jena.
2. Danciu M.,Parascan D.,2002, Botanica forestiera,Ed.Pentru viata ,Brasov.
3. Herwig R.,1980,L'encyclopedie practiquedes fleurs,plantes et arbres de jardin,Ed.CultureArt, Loisir, Paris.
4. HartmanT.,1995, Plant propagatio n principales and practices.University of California, Davis.
5. LemaireF., et les colab,1985, Proprietes of substrate made with spent mushroom compost,Symp,Use of compost as horticulture substrat,Gand Acta Hort,172.
6. LemaireF.,Dartigues A.,1989,Culture en pots et conteneurs- Principes agronomiques et application, INRA, Paris,PHM,Revue horticole Limoge.
7. IliescuA.,1996, O metoda de mare randament pentru butasire in teren deschis a arbustilor ornamentali.Prod.vegetala, Rev.Horticultura nr.5.
8. Krussman G.,1986, La pepiniere, La maison rustique,Paris.
9. ParniaP.,1992,Producerea si pastrarea materialului saditor dendrologic.Ed.Ceres, București
10. Ritiu A., Nicolescu N.L., 1987, Contributii la cultura malinului american (Prunus serotina), in nord –vestul tarii, Rev.Padurii, nr.4.
11. Robin D.,1997., Interet de la caracterisation biochimique pour l'evaluation de la proportion de matiere organique stable apres decomposition dans le sol et clasification des produits organo-minereraux,Agronomie 17.
12. Salmon N.,1992, Connaissance des plantes ligneuses, Gemblaux.
13. Sanssus A.,1990, Elements de sylviculture on region temperees, Gemblaux, Verviers.
14. Stanescu V.,1989, Dendrologie, Ed. Didactica si Pedagogica ,Bucuresti.
15. Softetea N.,Curtu L.,2007,Dendrologie,Ed.Universitatii „Transilvania'' Brasov.
16. Thome S.,1993, Arbustes et abrisseaux, Gemblaux,Verviers.
17. Thome S.,1982, Pepiniere d' arboriculture ornementale,ISI.Gembloux,1982.
18. Vlad I.,2011,Lucrari practice de impaduriri,Ed. Universitatii Oradea.
19. Vewer F,1995, Cuting and croping in artificial media,Acta Hort.50.
20. Zaharia D.,1994, Arboricultura ornamentala,Caiet de lucrari,USACN.