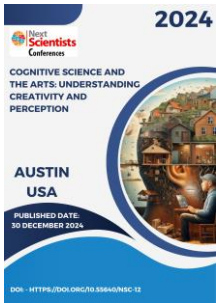
Published Date: - 30-12-2024

Page No: - 32-35



INFLUENCE OF HEAVY METALS IN SOIL ON GROWTH AND DEVELOPMENT OF VEGETATIVE ORGANS OF APRICOT

Juraev Ohunjon Bakhtiyor Ogli
Doctoral Student (Phd), Scientific Research Institute Of Horticulture, Viticulture And Winemaking Named After Academician M.Mirzaev, 100000 Shymkent Road Street Tashkent District Tashkent Region, Uzbekistan

Karimov Xusniddin Nagimovich
Doctor Of Agricultural Sciences (Dsc), Scientific Research Institute Of Horticulture, Viticulture And Winemaking Named After Academician M.Mirzaev, Uzbekistan

ABSTRACT

The article, based on laboratory experiments, studies the growth and development of apricot trees grown in soils contaminated with heavy metals (Co, Cu, Cd, Cr, Zn, Ni, Pb) and in natural soils. According to the results of the study, the size of one-year branches of apricot trees was within 49.5-58.3 cm. The smallest branches were observed in soils artificially contaminated with 5 times more chromium (Cr), and the highest values were observed in variants where copper and mineral fertilizers were used.

KEYWORDS: Apricot, tree, laboratory experiment, biometric indicators, stem, body circumference, heavy metals, artificially polluted, soil.

INTRODUCTION

Excess Cu in plant shoots can reduce the concentration of photosynthetic pigments and the rate of C fixation and negatively affect the oxidation process in the cell [3; 171-178 p.]. All this can reduce the absorption of water and nutrients in fruit trees, which is manifested in changes in the concentration of nutrients in the plant, a decrease in growth, especially in young fruit trees planted in soils with a high concentration of Cu. In addition, the transfer and accumulation of heavy metals in fruits can negatively affect the yield and quality of crops and, through fruits, human health [4; 593-610 p., 5; 85-92 p.].

Some types of heavy metals (Fe, Cu, Zn, Mn, Mo) are essential for plant metabolism in small concentrations, and become toxic if their amount exceeds a certain level. Some heavy metals (Pb, Cd, Hg) are considered metals that do not participate in plant metabolism, and they are toxic to plants even at very low concentrations [6; 150 p.].

When cadmium affects plants, it can cause a decrease in plant growth, stop photosynthesis, and cause leaf chlorosis. Cadmium can replace the element in enzyme systems, which leads to the disruption of many enzymatic reactions and the disruption of membrane permeability [7; 52-59 p.].

The growth and development of apple trees of the Golden Delicious variety on the MM-106 rootstock, grown in natural soil environments and soils artificially contaminated with heavy metals, showed biometric measurements such as trunk circumference, length of one-year

shoots, and tree height, which did not differ significantly from the biometric measurements of trees grown in natural soil [2; 18-20 p.].

MATERIALS AND METHODS

Laboratory experiments were conducted in 4 replicates on apricot trees planted in natural and artificially contaminated soils with heavy metals. Biometric measurements on trees were carried out after the end of the growing season using the methodological manual "Methodology of calculations and phenological observations in experiments with fruit and berry plants" (Buriyev Kh.Ch. 2014).

RESULTS AND DISCUSSION. The apricot variety "Subhani" was planted in laboratory experiments with heavy metal content 3 and 5 times higher than the permissible limit (MPC) on artificially polluted soil and natural soil environment, and the development of the above-ground part of the trees was studied.

The above-ground part of trees in different soil environments had different dimensions. While the height of trees in control soils was 135.7 cm, the trunk diameter was 10.9 cm, and the average length of one-year shoots was 51.7 cm, this indicator was slightly higher in trees in the Soil+N120P60K30 (Background) variant, i.e., in which mineral fertilizers were applied, with a tree height of 154.1 cm, a trunk diameter of 11.1 cm, and a length of one-year shoots of 57.5 cm.

Figure 1. Apricot trees grown in a laboratory experiment

The soil environment contaminated with elements Cr, Cd, Pb of the experiment had a negative impact on the development of apricot branches, the height of trees, the length of annual branches and the general state of tree growth in these variants. lower compared to trees with mineral fertilizers and other variants. The height of the tree in the variant of soil contaminated with chromium (Cr) 3 times higher than the permissible norm is 138.0 cm, the height of the tree in the variant with an excess of 5 times the amount is 128.2 cm compared to the height of trees. in the soil environment contaminated with chromium in a slightly smaller amount, a low indicator was recorded at 9.8 cm. It was noted that the biometric dimensions of the aboveground part of the trees in all variants contaminated with 3 and 5 times more heavy metals compared to the permissible norm of heavy metals in the soil were 3 times lower in the soil. variants 5 times more (Figure 2).

Apricot trees had one-year branches measuring 49.5-58.3 cm, with the smallest branches observed in soils artificially contaminated with 5 times more chromium (Cr), and the highest values observed in variants with copper and copper mineral fertilizers.

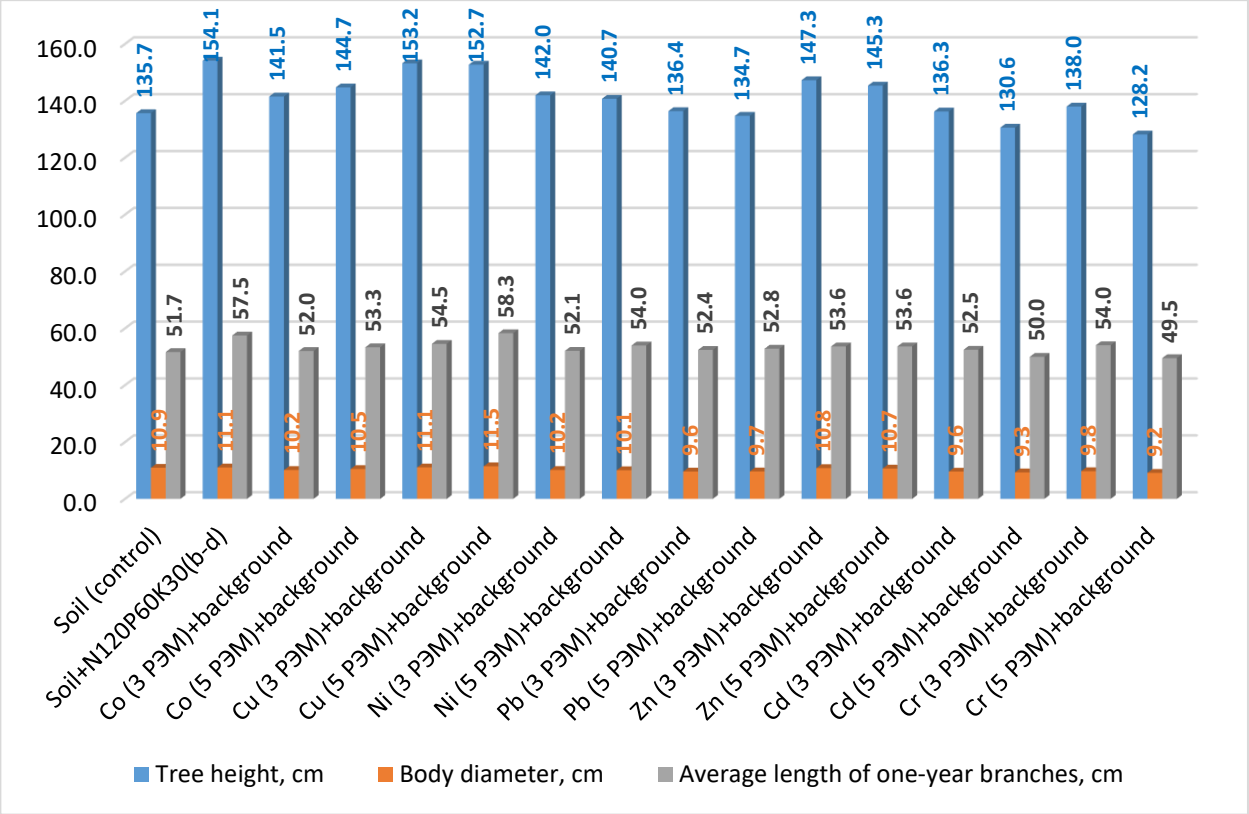


Figure 2. Effects of heavy metals on the formation of the above-ground part of apricot trees "Subkhani" (2021-2023 y.)

CONCLUSION

The length of one-year-old shoots of apricot trees in the control variant of the study was 51.7 cm, 57.5 cm when mineral fertilizers (NPK) were applied, 52.0-53.3 cm in soil contaminated with the element cobalt, 54.5-58.3 cm when contaminated with copper, and 53.6 cm when contaminated with spirit.

According to the biological characteristics of the apricot tree, its adaptability to soil and climatic conditions varies depending on the concentration of heavy metals in the soil. An increase in the amount of chromium, lead, cadmium and nickel in the soil above the permissible norm negatively affects the development of the apricot tree.

REFERENCES

1. Bo'riev X.Ch., Yenileev N.Sh., Asatov Sh.I. va b. Mevali va rezavor mevali o'simliklar bilan tajribalar o'tkazishda hisoblar va fenologik kuzatuvlar metodikasi. uslubiy qo'llanma – Tashkent: 2014. 6-8 p.
2. Jo'raev O.B. Og'ir metallar bilan ifloslangan tuproqlardagi olmaning "golden delishes" navi daraxt va mevalarining biometrik ko'rsatkichlari // Agro ilm. – 2023. №6. 18-20 p.
3. Cambrolle J., Garcia, J.L., Ocete R. and others Evaluating wild grapevine tolerance to copper toxicity. Chemosphere, Oxford, v.120, p.171-178, 2015.
4. Miotto A., Ceretta C.A., Brunetto G. and others Copper uptake, accumulation and physiological changes in adult grapevines in response to excess copper in soil. Plant and Soil, The Hague, v.374, p.593-610, 2014.

5. Toselli M., Baldi E., Marcolini G. and others Response of potted grapevines to increasing soil copper concentration // Australian Journal of Grape and Wine Research, Glen Osmond 2009, v.15, p.85-92.
6. Ильин, В.Б. Тяжелые металлы в системе почва-растение / В.Б. Ильин. Новосибирск: Наука, 1991. – 150 с.
7. Ильин В.Б. Коценке массопотока тяжелых металлов в системе почва-сельскохозяйственная культура // Агрохимия. 2006. № 3 С. 52-59 с.