

**ROOT FORMATION STIMULATORS AND THEIR INFLUENCE ON THE ROOTING OF GREEN AND WOODEN CUTTINGS OF PEAR CLONE**  
Zhuravleva A.V.

**Abstract.** In the garden of Omsk Agrarian Scientific Center, located in the southern forest-steppe of Omsk region in 2018-2020 research has been carried out with the aim of studying the features of the influence of various stimulants of root formation during the propagation of clonal pear rootstocks by green and lignified cuttings. The soil is meadow-chernozemic medium loamy with a pronounced sandy fraction, the reaction of the soil solution is close to neutral. The object of research is clonal pear stocks PG 2, PG 12, PG 17-16. Rooting of green and lignified cuttings was carried out in a greenhouse with a film coating with an artificial fogging installation. The substrate is a mixture of sand and peat (1 to 1). Planting scheme of cuttings 5×5 cm, in four replicates (50 pcs.), Placement is randomized. Kornevin (powdering of sections), and Ribav-extra, control – water (duration of exposure - 16 h) were used as stimulants of root formation during green cuttings. When propagating by lignified cuttings, cornevin (0,1%) and ribav-extra (0,01%) were used; water was used as control (exposure duration - 16 h). Clonal pear rootstocks tolerated the winter conditions of the study years relatively favorably. The exception was winter 2019-2020, the total degree of freezing was 1 point in the PG 2 and PG 17-16 rootstocks, and 5 points in the PG 12 rootstock (90% plant loss). The beginning of the growing season in 2018 was marked on May 22-23, in 2019 - May 5-6, in 2020 - April 18-19. In 2018-2019, green cuttings were carried out on June 20, in 2020 - on June 10. Earlier terms of cuttings in 2020 are explained by the rapid regrowth and lignification of the shoots (hot weather and lack of precipitation in the first months of the growing season). In the control, massive root formation was noted after 6 weeks. The treatment of cuttings with growth stimulants promoted the acceleration of root formation, which was observed after 4 ... 5 weeks. On average, over the years of research, rooting rate when using Kornevin, in comparison with control, increased by 13 ... 18%, Ribav -extra - by 10 ... 13%. The rootstock PG 12 is characterized by a higher rooting Kornevin of green cuttings (51.5 ... 56.5%) than that of PG 2 (47.7 ... 49%) and PG 17-16 (41.7 ... 44.3%). Rooting rate when using Kornevin was 50%, Ribav - extra 47%. PG 12 is the only rootstock under study in which rooting of lignified cuttings is observed: in the control 24%, when using preparations 44.5 ... 52%.

**Keywords:** reproduction, clonal rootstocks, pear (*Pyrus*), green cuttings, woody cuttings, rooting.

**References**

1. Akimov MYu, Makarov VN, Zhanova EV. [The role of fruits and berries in providing a person with vital biologically active substances]. *Dostizheniya nauki i tekhniki APK*. 2019; 33 (2): 56 p. Russian
2. Semin IV, Dolmatov EA, Ozherel'eva ZE. [Prospects for the use of intensive rootstock for cultivation of pear orchards in Central Russia]. *Ovoshchi Rossii*. 2020; (5): 75 p. Russian.
3. Drabud'ko NN, Ganusenko MYu, Grusheva TP. [Clonal rootstocks - the basis for increasing the productivity of fruit crops]. *Plodovodstvo: sb. nauch. trudov*. Minsk: "Institut plodovodstva". 2018; 247 p. Russian.
4. Budagovskii VI. *Kul'tura slaboroslykh plodovykh derev'ev*. [Culture of low-growing fruit trees]. Moscow: Kolos. 1976; 303 p. Russian.
5. Samus' VA. *Agrobiologicheskie osnovy intensifikatsii proizvodstva plodov yabloni v respublike Belarus'*: avtoref. dis. ... kand. s.-kh. nauk. [Agrobiological foundations of the intensification of apple fruit production in the Republic of Belarus: author's abstract for a degree of Ph.D. of agricultural sciences]. Gorki. 2007; 47 p. Russian.
6. Kastritskaya MS, Samus' VA, Lugovtsov AN. *Razmnozhenie perspektivnykh klonovykh podvoev grushi*. *Plodovodstvo: sb. nauch. trudov*. [Reproduction of promising clonal rootstocks of pear. Fruit production: collection of scientific papers. scientific works]. Samokhvalovichi: "Institut plodovodstva". 2016; 98 p. Russian.
7. Savin EZ, Mursalimova GR, Degtyarev NA. [Clonal rootstocks of apple and pear in the production conditions of Orenburg region]. *Vestnik Orenburgskogo gosudarstvennogo universiteta*. 2008; (12): 20 p. Russian.
8. Isaev RD, Sergeev DV. *Ispol'zovanie novykh klonovykh podvoev grushi v tekhnologii vyrashchivaniya posadochnogo materiala*. *Plodovodstvo i yagodovodstvo Rossii*. [The use of new clonal pear rootstocks in the technology of growing planting material. Fruit and berry production of Russia]. Moscow: VSTISP. 2012; 31 (1): 220 p. Russian.
9. Isaev RD, Sergeev DA. *Kharakteristika perspektivnykh klonovykh podvoev grushi VNIIS im.Michurina VI*. *Plodovodstvo i yagodovodstvo Rossii*. [Characteristics of promising clonal pear rootstocks VNIIS im.Michurina VI. Fruit and berry growing in Russia]. Moscow: VSTISP. 2009; (21): 124 p. Russian.
10. Dragavtseva IA, Dragovtsev VA, Efimova IL. [Evaluation of the interaction of genotypes of scion and rootstock of an apple tree using biometric methods]. *Sel'skokhozyaistvennaya biologiya*. 2015; 50 (5): 590 p. Russian.
11. Nikitin AV. [The main directions of the implementation of the national project "Science" in Tambov region (on the example of the gardening industry)]. *Dostizheniya nauki i tekhniki APK*. 2019; 33 (2): 5 p. Russian.
12. Aksenenko VF, Abaev SA. [Prospects of clonal rootstocks for increasing the yield of apple seedlings]. *Vestnik Rossiiskoi akademii sel'skokhozyaistvennykh nauk*. 2008; (2): 39 p. Russian.
13. Mursalimova GR. [Use of plant growth regulators in the reproduction of fruit crops rootstocks]. *Sovremennoe sadovodstvo*. 2018; (3): 147 p. Russian.
14. Zhuravleva AV. [Features of reproduction of clonal rootstocks of apple trees by green cuttings using various stimulants of root formation]. *Dostizheniya nauki i tekhniki APK*. 2019; 33 (12): 65 p. Russian.
15. Maarri K, Haddad S, Fallouh I. [Al selections of *Pyrus syriaca* as promising rootstocks for pear cultivars. VIII International Symposium on Canopy, Rootstocks and Environmental Physiology in Orchard Systems]. *Acta Hort*. 732, 2007; 1 (104): 217 p.
16. Lukatkin AS, Mokshin EV, da Silva JAT. [Use of alternative plant growth regulators and carbon sources to manipulate *Dianthus caryophyllus* L. shoot induction in vitro]. *Rendiconti Lincei*. 2017; 3: 583 p.
17. Mishchenko LN. *Pochvy Omskoi oblasti i ikh sel'skokhozyaistvennoe ispol'zovanie*. [Soils of Omsk region and their agricultural use]. Omsk: OmSKhI, 1991; 164 p. Russian.
18. Shver TsA. *Klimat Omska*. [Climate of Omsk]. Leningrad: Lenizdat. 1980; 250 p. Russian.
19. Kovba SA. *Agroklimaticheskii spravochnik po Omskoi oblasti*. [Agroclimatic reference book on Omsk region]. Leningrad: Lenizdat. 1959; 226 p. Russian.
20. Tarasenko M. T. *Zelenoe cherenkovanie sadovykh i lesnykh kul'tur*. [Green cuttings of garden and forest crops]. Moscow: MSKhA. 1991; 268 p. Russian.
21. Sedov EN, Ogol'tsova TP. *Programma i metodika sortoizucheniya plodovykh, yagodnykh i orekhoplodnykh kul'tur*. [Program and methodology for the study of varieties of fruit, berry and nut crops]. Orel: VNIISPK. 1999; 608 p. Russian.
22. Gul'ko IP. *Metodicheskie rekomendatsii po kompleksnomu izucheniyu klonovykh podvoev yabloni*. [Methodical recommendations for the comprehensive study of clonal apple rootstocks]. Kiev: Izd. Ukrainskogo NII sadovodstva. 1981; 23 p. Russian.

**Authors:**

Zhuravleva Anna Viktorovna – Ph.D. of agricultural sciences, senior researcher of the horticulture sector,  
e-mail: sibniish@bk.ru  
Omsk Agricultural Scientific Center, Omsk, Russia