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COMPATIBILITY OF CHERRY VARIETIES AND TREE STOCKS FROM THE ANATOMIC VIEWPOINT

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With the help of anatomical sections it is possible to prove the annual planting material compatibility. According to the data of our experiments the best stock for cherry trees are *Cerasus mahaleb* and *C. microcarpa* seedlings and plants of vegetative propagation. The best compatible varieties are Lubskaya, Podbelskaya and Zhokovskaya.

Cambium – parenchyma cells – callus – xylem – phloem

Անատոմիական կտրվածքների միջոցով հնարավոր է ապացուցել միամյա տնկանյութի համատեղելիությունը: Մեր փորձերի տվյալների համաձայն բալենու համար որպես լավագույն պատվաստակալ հանդիսանում են Բալենի մանրապտուղ և Բալենի մահալեբյան տեսակների սերմնաբույսերը և վեգետատիվ ճանապարհով բազմացող բույսերը: Պատվաստակալների հետ համատեղելի լավագույն սորտերն են Լյուբսկայա, Պոդբելսկայա, Ժուկովսկայա:

Կամբիում – պարենքիմային բջիջներ – կալուս – քսիլեմ – ֆլոեմ

С помощью анатомических срезов можно доказать совместимость однолетнего посадочного материала. Согласно данным наших экспериментов, лучшим подвоем для вишни являются сеянцы и растения, размножающиеся вегетативным способом, *Crasus mahaleb* (L.) *Mill*. и *C. microcarpa* (Pall.) Spach.. Наилучшие совместимые сорта с подвоями – Любская, Подбельская и Жуковская.

Камбий – паренхимные клетки – каллус – ксилема – флоэма

The concept of stock-graft compatibility generally implies the ability of plants for mutual growth after grafting functioning as one integral organism providing the interchange of nutrients. From this point of view the incompatible plants are those which demonstrate short, incomplete joint growth or so-called co-growth (fusion) which is the result of only callus mass intergrowth without connection of conducting elements.

The interrelation of engrafted variety and tree stock often appear to have strongly express singularity. The species of *Cerasus Mill.* genus, including also the ones under our study, have nearly similar wood which is typical of *Prunus L.* genus species composition. The wood of these two genera differ only in insignificant quantitative traits [1, 4].

Materials and methods. The experiments were conducted on 3 species: *C. mahaleb* (L.) *Mill.*, *C. microcarpa (Pall.) Spach.* and *C. incana (C.A. May) Boiss.* species served as a tree stock and Sisiani, Zhukovskaya, Podbelskaya, Lubskaya varieties – as grafts. The anatomical sections from the grafted area were done with two replications, length-wise and width-wise. Before sectioning the samples were softened in the water by heating for 20 min thereafter were kept them for 10 days in 70.0 % ethyl alcohol, 40.0% formalin, 5.0% acetic acid mix (*FAA*). The cuts were done with *МЗ-2* (1981) freezing microtome equipped with gas. Thereafter the segments were treated with hematoxylin, eosin, 96% ethyl alcohol, carboxyl, xylol, the permanent preparations were prepared using synthetic protein. Microscope photos were taken. The sections were made at the end of the vegetation. To carry out anatomic sections there were 12 samples taken from different stock-graft pairs. For each sample there were 8-30 permanent preparations prepared. The photos of permanent preparations were taken by binocular microscope at 100 × magnification.

Anatomic investigations were carried out by Lotova method [2].

Results and Discussion. After scion budding the ingrowth and further fusion takes place by passing the mentioned phases. At first, 4-5 hours after inoculation the process of mutual growth of scion and stock takes place in the following way: the cells of the stock injured tissues generate callus – an insulating layer which consists of necrotic cells. The callus production takes place more intensive at the section lower part and then at the cut edges. The important role in this process belongs to the cambium cells [3].

The regeneration of the stock bark section depends on the state of the cells that transfer the nutrients. The transversal cut made on the bark obstructs the nutrient movement in the cut place forcing them to move bypassing the injured place. The change in the nutrient flow direction generates the vascular fascicle curve (bend, winding). The larger the transverse section, the more unfavorable conditions are created for the wound healing. Callus production is also observed if the inoculated scion is alive. Since in our experiments the scion budding was performed without wood (spade budding) thus the callus mainly generated at the scion edges, at that, on its lower surface. The callus generates also from nucleus rays, from the scion bark parenchyma. When the graft callus and stock callus join, the fusion takes place. At first the so-called *interstitial tissue* generates that consists of *parenchyma cells*. Thereafter the *vascular fascicles* start developing. In the interstitial tissue area the so-called "window cleft" is formed due to which the vascular elements conjoin. The interstitial tissue can be resolved completely without leaving a trace or remain of big or small size. Complete resorption indicates the complete fusion of the grafted components. The more layers of interstitial tissue remain, the worse the process of fusion is going on. The growing cells tear the insulating layer facilitating the latter decomposition, assimilation and formation of secondary cambium. Connection is established between the conductive systems of the stock and the graft. The cambium layer generates the secondary phloem and xylem. The formation of these tissues indicates the completion of the stock and graft intergrowth (fusion) and free nutrient interchange. The formation of callus is more active at the cut lower part involving the grafted bud level. The fusion and production of new vascular elements of the buds engrafted high goes on relatively slow. Sometimes the scion upper part fails in adhesion irrespective of its lower part strong adhesiveness.

It happens because the scion upper part was drawn into the vascular joint by force and later on it remains "separated, non-conducting" off the nutrient normal interchange, badly provided with nourishment. Besides, the grafted bud, by the polar force, due to its tissue development, activates in its lower part. For successful fusion of the stock and the graft the scion should have not very long lower part (1-1.5 cm) and similar to it or a bit longer upper part. In this case the bud is set in closer to the bark and lower part of the section that provides it better intergrowth.

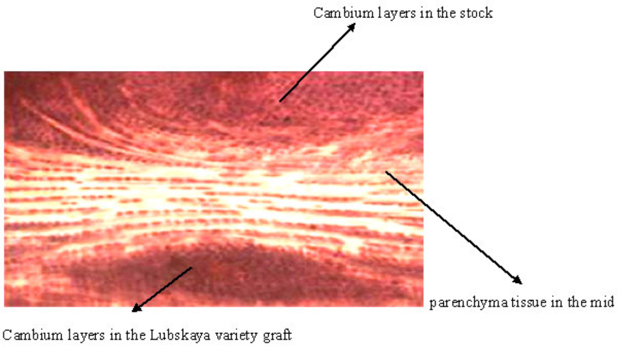

Fig. 1. Cambium layers (with parenchyma tissue in the mid) of C. mahaleb stock - Lubskaya variety graft

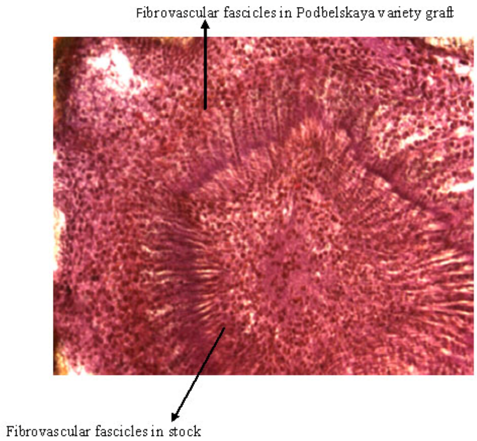

Fig. 2. Joint of C. microcarpa stock and Podbelskaya variety graft and formation of fibrovascular fascicles

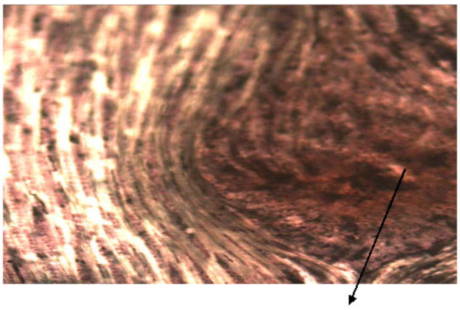

Fig.3. Vessel fusion onset of C. incana stock - Zhukovskaya variety graft

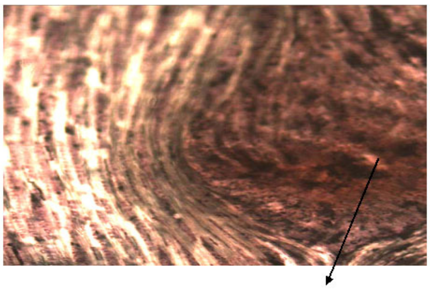

Fig.4. C. incana - Sisiani, the insulating layer is torn, the graft and stock drift apart

The photo of incompatible pairs (fig. 4) reveal that in the stock callus there are produced cambium and cork cambium which generates cork cover making impossible the further growth.

The photos of the compatible pairs (fig. 1, 2, 3) reflect the integrated cambium of stock and graft, the integrity of conducting vessels, mutual investing tissue, the insulating layer disappeared.

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