OPINION

Considering the dissertation for obtaining a **PhD** degree based on the area of higher education, classified as code - **6. Agricultural Sciences and Veterinary Medicine**, professional direction - **6.1 Plant Production,** scientific specialty of **"Fruit growing"**

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Topic of the dissertation: A study on GF 677 and GXN 15 (Garnem) clonal rootstocks grown in nursery and peach and plum orchards

Opinion prepared by: Associated Professor PhD Galya Stoeva Dobrevska, Department of Viticulture and Fruit Growing at the Agricultural University - Plovdiv; area of higher education, classified as code 6. Agricultural sciences and veterinary medicine, professional field code 6.1. Plant production, scientific specialty "Fruit Growing", appointed as a member of the scientific committee with order No. RD 16-1125/10.10.2024

I.Problem overview.

The fruit production from plums orchards in our country is mainly used for processing purposes, while fresh consumption occupies a small share. Most areas are extensive, cultivated under scarce or absence irrigation conditions. At the moment, plum orchards in our country are mainly created with a seminal janka rootstock, which cannot meet the modern trends for production intensification of plum fruits at the fresh produce market. These reasons mainly lead to sub-optimal yields and low incomes.

Peach production is simultaneously oriented towards the fresh fruit market and processing. Overplanting of peach orchards and their relatively short lifespan are common issues with this type of fruit. The reason for this stems from the use of peach seminal rootstock, which is vulnerable to soil fatigue and requires optimal soil conditions.

The problems associated with these two fruit varieties can be largely addressed by introducing new rootstocks. In this context, the rootstock hybrids between peach and almond, which are studied by the doctoral candidate, show significant potential for overcoming the existing challenges in fruit growing, specifically in the cultivation of peaches and plums for fresh fruit production and processing.

II. Aim, Objectives, Hypotheses, and Research Methods.

The goal of the doctoral study is clearly and precisely formulated and aims to acquire new knowledge about the growth characteristics of GF 677 and GXN 15 (Garnem) rootstocks

in a nursery and their impact on the vegetative and reproductive expressions of three peach and plum cultivars in an orchard under specific soil-climate conditions in Southern Bulgaria, to determine the more suitable one.

Five specific tasks are outlined, related to the main objective of the study. They include research on:

•To establish the behavior of GXN 15 (Garnem) and GF 677 rootstocks during the production of peach and plum trees in a nursery;

• To determine the influence of GXN 15 (Garnem) and GF 677 rootstocks on growth characteristics of modern peach and plum cultivars in an orchard;

• To determine the influence of GXN 15 (Garnem) and GF 677 rootstocks on duration and manifestation of some phenological phases in modern peach and plum cultivars in an orchard;

• To determine the influence of GXN 15 (Garnem) and GF 677 rootstocks on reproductive characteristics of modern peach and plum cultivars in an orchard;

• To determine the influence of GXN 15 (Garnem) and GF 677 rootstocks on fruit flesh composition and heavy metal accumulation in modern peach and plum cultivars.

To achieve the stated goal and tasks, a well-planned methodological part is presented. Considerable study work was completed, including properly completed experiments. A wide range of parameters was monitored and analysed by implementing advanced technology and techniques.

III. Clarity and presentation of the obtained results.

The dissertation consists of 134 typed pages, and is well-structured into seven main sections. The standard volume and balance between the parts was maintained. The results are summarised and thoroughly presented with 25 tables, 51 figures, and 28 photos.

IV. Literature used and discussion of results.

The literature review is comprehensive and presents the current state of the issue. It is based on 227 literary sources, of which 196 in Latin script and 31 in Cyrillic script.

Scientific publications related to current topics in fruit growing were analysed. Detailed information is provided on general characteristics of rootstocks, their advantages and disadvantages, approaches to solving existing problems associated with their use, propagation methods, as well as detailed information on some apricot and plum rootstocks that deserve attention.

The literature review, as well as the conclusions drawn from it, demonstrates good theoretical preparation of the candidate regarding the issues directly related to the subject of study. The discussion of results is extensive and based on proper analysis and interpretation of findings. The presentation and discussion of the obtained results employ a well-grounded scientific style. Conclusions and statements are formulated after each section based on the analysis of results.

V.Contributions of the doctoral thesis.

As a result of the experimental activities and the analysis of the obtained results, the following contributions are identified:

Scientific

A comprehensive body of knowledge was acquired regarding the behavior of peach-almond hybrid rootstocks,

GF 677 (P. dulcis x P. persica) and GXN 15 (Garnem) (Garfi, P. dulcis Nemared, P. persica), and their impact on:

- the growth and reproductive expressions of modern peach and plum cultivars in a nursery and orchard;
- the progression of different phenological phases in modern pech and plum cultivars in an orchard;
- the chemical composition of fruits in modern peach and plum cultivars in an orchard.

Scientific and applied

- Peach-almond hybrid rootstocks GF 677 (*P. dulcis x P. persica*) и GxN15 (Garnem) (Garfi, *P. dulcis* Nemared, *P. persica*):

- exhibit good compatibility with all plum and peach varieties participating in the study;

- in plum plantations, they deliver higher yields per unit area compared to the traditional seminal Janka (*P. cerasifera*);

- they do not form shoots in plum plantations, unlike the traditionally used seminal Janka (*P. cerasifera*);

- gives higher yields per unit area in the peach and plum cultivars involved in the study compared to GxN15 (Garnem) (Garfi, *P. dulcis x* Nemared, *P. persica*);

- The use of the rootstock is recommended GF677 (*P. dulcis x P. persica*) in the production of plum fruits, as an alternative to the widely seminal Janka (*P. cerasifera*) in our country.

VI. Critical remarks and questions.

I have not critical comments, questions, or recommendations for the doctoral candidate.

VII. Published articles and citations.

Three joint publications directly related to the dissertation work were attached. The necessary total number of points is achieved according to the requirements of the National Center for Information and Documentation (NACID), which meets the minimum scientometric requirements for obtaining an educational and scientific degree of 'Doctor', in accordance with the Law on the Development of the Academic Staff.

Six citations are mentioned.

The presented abstract objectively reflects the structure and content of the dissertation work.

CONCLUSION:

Based on the various research methods applied by the doctoral candidate, the appropriately conducted experiments, and the reached generalisations and conclusions, I believe that the presented dissertation work meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB). This provides me with grounds to assess it POSITIVELY.

I would also like to propose to the esteemed Scientific Committee to vote positively and award Mladen Nanev Petrov the educational and scientific degree of **"Doctor"** in the scientific specialty of **"Fruit growing".**

Date: 15.11.2024

FORMAL OPINION PREPARED BY: .....

(Assoc. prof. PhD Galya Dobrevska)