

Резюме на трудовете свързани с конкурса за избор на академичната длъжност „Професор“

1. **Гандев, С.** (2015). *Подобряване на ореховото производство – размножаване, сортоизучаване и отглеждане. Автореферат за присъждане на научната степен „доктор на науките“. Институт по овощарство – Пловдив.*

2. **Gandev, S., V. Arnaudov and D. Serbezova** (2015). *Selection and cultivation of local wild walnut type in Bulgaria. Acta Hortic, 1074: 135-139.*

Abstract

Juglans regia L. is the only wild walnut type spread in Bulgaria. It is grown in the country as a cultural plant, but also occurs in the wild in the western Bulgaria in the region of the Rhodope mountains. The major cultivars in the country are obtained from natural populations. The selections of superior genotypes started in the year 1965 by Nedev and orchards were established with them, which are still under cultivation. Genetic material has been spread in Macedonia (the cultivar Sheynovo), in India (the cultivar Dryanovski) and in some other countries. The agrobiological characteristics of the local walnut cultivars Izvor 10, Sheynovo, Silistrenski, Dryanovski, etc. were described in the present paper and details of their lateral fruiting were discussed. The article presents also data about the susceptibility of the studied walnut cultivars to the attacks to *G. leptostyla* (Fr.) and *X. arboricola* pv. *juglandis* (Pierce) Dye and codling moth (*Cydia pomonella* L.) and their sensitivity to late spring frosts.

3. **Uzunova, G., M. Perifanova-Nemska, M. Stojanova, S. Gandev** (2015). *Chemical composition of walnut oil from fruits on different years old branches. Bulgarian Journal of Agricultural Science, 21 (3) 494-497.*

Abstract

The influence of the year of branches on the physico-chemical composition of walnut oil was investigated. There was an increasing of oil content with increasing the year of the branch found. The latter did not exhibit significant effect on fatty acid composition. All samples content predominantly unsaturated fatty acids - mainly oleic and linoleic acids. Linolenic was in the range of 9.66–10.77%. The highest content of polyunsaturated linoleic and linolenic acids was 64.14% and 10.77% respectively in fruits grown on four year old branch. The amount of tocopherols was the highest in the oil isolated from one year old branch - 567 mg

kg-1. In tocopherol fraction of all tested oils γ -tocopherol dominates, followed by δ -tocopherol and α -tocopherol. The highest content δ -tocopherol was observed in the oil of one-year old branch - 9.7%. β -tocopherol was not found in studied walnut oils. The amount of the sterols was in the range of 0.5–0.7%. β -sitosterol dominates in sterol fraction - 86.2–89.8%.

4. *Gandev, S. (2016). Application of hot callus and epicotyl grafting methods in walnut propagation. Acta Horti, 1139: 475-478.*

Abstract

Experiments with the application of the new hot callus and epicotyl grafting methods were carried out at the Fruit Growing Institute – Plovdiv, Bulgaria. The paper treats the use of both methods in walnut propagation under production conditions. All the elements and principles of the technological process are described in detail. One-year-old seedlings of *Juglans regia* L. were used as rootstocks. Grafting was performed with 'Izvor 10' cultivar. The percentage of the successfully propagated plants depended on the grafting method. The results showed that the successfully propagated walnut plants were 85.5% in the hot callus method and 71.0% in the epicotyl grafting. The conclusion was drawn that both methods are suitable for walnut propagation in commercial nurseries.

5. *Dzhuvinov, V., S. Gandev, A. Matova (2016). Apple breeding for tree architecture in Bulgaria: spindle and Solaxe trees. Acta Horti, 1127: 23-28.*

Abstract

Apple breeding for resistance to major diseases and for spindle and Solaxe tree architecture aims to significantly lower the total cost of fruit production. During the second stage of our breeding program for resistance to scab, mildew and the aphids *Dysaphis plantaginea* Pass. and *Aphis pomi* De Geer, we selected hybrids with naturally attained spindle and Solaxe trees. In the progenies of 'Enterprise', 'Freedom', 'Aurora', 'Generos', 'Paulared', 'Prima', 'Tavria', 'Pionier' o.p. and 'Akane' ('Primrouge') \times 'Krimskoe', 'Akane' \times 'Florina', and 'MacIntosh Wjczik' \times 'Paradox', we found trees with a habit resembling the characteristics of the spindle training system. Plants with a weeping habit were selected from crosses of 'Paradox' \times 'Prima' and 'Elize Rathke' \times 'Florina', and between those hybrids a further set was selected which exhibited a natural Solaxe, the modern system for training and pruning in apple orchards. Selected hybrids with the Solaxe growth habit will be crossed to improve fruit quality and to study the mode of inheritance of the Solaxe growth habit.

6. Dzhuvinov, V., S. **Gandev** (2016). *Evaluation of Fruit Bearing Habit of Apple, Sweet Cherry, Walnut and Strawberry Cultivars in Bulgaria-An Overview. Acta Hortic, 1139: 177-182.*

Abstract

One of the main aims in modern orchards is obtaining high quality fruits and regular cropping and managing the tree shape and fruit load with minimal pruning, by taking advantage of the natural trend of the cultivar and thereby reducing the cost of this manual operation. This motivated us to start at our Institute a bearing habit evaluation of cultivars from different fruit species, such as pome, stone, nut and small fruit groups. The fruit bearing habit as a part of fruit tree architecture was evaluated in apple orchards with 49 cultivars, including 22 resistant to scab on ‘MM106’ and ‘M9’ rootstocks. According to Lesspinasse classification, the cultivars have been divided in four fruiting types: type I ‘Starkrimson’, type II ‘Reine des Reinettes’, type III ‘Golden Delicious’ and type IV ‘Granny Smith’. The apple cultivars of type I and II have the fruiting spur habit related to biennial bearing and type IV to regular ones. The fruiting type of 9 sweet cherry cultivars on ‘Gisela 5’ rootstock have been divided in two types – type I ‘Sunburst’ (‘Regina’, ‘Kordia’, ‘Lapins’, ‘Katalin’) and type II ‘B. Burlat’ (‘Nalina’, ‘Summit’, ‘Hudson’). According to the type of bearing habit of 7 walnut cultivars grafted on *Juglans regia* L. seedlings, the lateral bearing cultivars ‘Izvor 10’, ‘Fernor’ and ‘Lara’ are very promising under our climatic conditions. The walnut trees have higher fruit and kernel weight on one- and two-year-old wood than on three- and four-year-old wood. The percentage of ripened strawberry fruits from first three pickings is more than 50% of the total crop from one-year-old plants in cultivars ‘Thetis’, ‘Don’, ‘Seascape’, ‘Bogota’, ‘Selene’, ‘Selva’, ‘Idea’, ‘Linda’ and it is higher than from two-year-old plants. The evaluation of the fruiting type helped us to improve and maintain a good balance between vegetative growth and productivity.

7. **Gandev, S.**, P. Savov, E. Isuf, V. Bozhkova (2016). *Some growth and reproductive traits of six plum cultivars. Acta Hortic, 1139: 213-218.*

Abstract

The study was carried out in the experimental plantation of the Fruit-Growing Institute - Plovdiv in 2014 and 2015 with six plum cultivars ‘Bellamira’, ‘Jojo’, ‘Tophit plus’, ‘Topstar plus’, and ‘Topgigant plus’, compared to ‘Stanley’ that was used as a standard. The following traits were studied: angle between the skeletal branches and the central leader, annual shoot length growth, distribution of the different fruiting twigs (spurs and shoots) on fruiting wood of different age, the average number of flower buds on spurs and shoots and distribution of fruits on branches of different age. The largest angle of skeletal branches was found in the

cultivars 'Jojo' and 'Bellamira', 68.1 and 60.6°, respectively. The biggest shoot length was recorded in 'Bellamira' and the smallest one in 'Jojo', 'Tophit plus' and 'Stanley'. The basic fruit bearing twigs in plum are the spurs, predominantly distributed on two- and three-year-old fruiting wood. The number of flower buds in a spur varied from 2.1 to 2.2 and the average number of flowers in a flower bud was 1.7-2.1. According to the distribution of fruits, the studied plum cultivars can be divided into three groups: cultivars bearing fruits predominantly on young fruiting wood (one-year-old shoots), cultivars bearing fruits predominantly on two- and three-year-old wood and cultivars bearing fruits evenly along the fruiting wood of different age.

8. *Gandev, S., I. Naney, P. Savov, E. Isuf, G. Kornov, D. Serbezova (2016). The effect of three training systems on the vegetative and reproductive habits of the apple cultivar 'Braeburn' grafted on M9 rootstock. Bulgarian Journal of Agriculture Science, No 4, 22: 600-603.*

Abstract

There is not a uniform accepted view in the world on the choice of a universal apple tree training system, because the vegetative and reproductive habits of the separate cultivars depend on the soil and climatic conditions of the countries where they are grown. The aim of the experiment was to study the effect of the training systems Slender spindle, Solen and Vertical axis on the growth and fruiting habits of the apple cultivar 'Braeburn' grafted on M9 rootstock and grown under the conditions in Bulgaria. The experimental plantation was established on the territory of the Fruit-Growing Institute in Plovdiv with geographical coordinates of 42°9' N latitude, 24°45' E longitude and 160 meters altitude. The study was carried out during the period 2013–2015, i.e. third-year vegetation of the trees, covering the first three fruiting seasons. The results obtained show that the largest average and cumulative yields per ha were harvested when Vertical Axis training system was used, which was due to the better reproductive habits of the trees in that variant and the larger number of trees per ha. Under the conditions of our country, tree training to Vertical Axis system is recommended for 'Braeburn' apple cultivar grafted on M9 rootstocks.

9. *Kutinkova, H., S. Gandev, V. Dzhuvinov, B. Lingren (2016). Control of oriental fruit moth *Cydia molesta* and peach twig borer *Anarsia lineatella* by using pheromone dispensers in Bulgaria. Journal of Biopesticides 9(2): 220-227.*

Abstract

Oriental fruit moth (OFM), *Cydia molesta* (Busck) (Lepidoptera: Tortricidae) and peach twig borer (PTB) *Anarsia lineatella* (Zell) (Lepidoptera: Gelechiidae) are

economically important pests of peach, nectarine and apricot in Bulgaria. Their larvae cause damage, infesting shoots and fruits. Investigations were carried out in two fruit-bearing commercial peach orchards in South-East Bulgaria in the Sliven district during the period 2014 -2016. The aim of this study was to test the effectiveness of mating disruption (MD) in control of pests in peach orchards, using CIDETRAK® OFM (Oriental Fruit Moth)/PTB (peach twig borer) and CIDETRAK® OFM/PTB MESO dispensers. The damage to shoots was evaluated during the first generation of OFM and PTB on 20 trees, randomly selected within the central area of each block. Correspondingly, fruit damage was recorded on 100 fruits per each selected tree; so, 2000 fruits were inspected for damage from both pests in each block. The rate of damaged fruits in the trial plots were compared with that in the reference orchard, located in the vicinity, treated with conventional pesticides. CIDETRAK® OFM/PTB (@400 dispensers/ha) and CIDETRAK® OFM/PTB MESO (@80 and 20 dispensers/ha) completely inhibited *C. molesta* in the pheromone traps installed in the trial plots, indicating a high level of disruption. The percentage of shoots infested by OFM and PTB larvae was 0% in the MD plots, and the damage rate to fruits was rather low (>1%). The present results do confirm that mating disruption, using CIDETRAK® OFM/PTB and CIDETRAK® OFM/PTB MESO dispensers, can provide a more effective control of both important pests on peach - oriental fruit moth and peach twig borer. The use rate of CIDETRAK® OFM/PTB and CIDETRAK® OFM/PTB MESO dispensers shows that the reduced rate of dispensers does not affect the effectiveness of mating disruption and will help the growers to decrease labour in the field. Applications of these dispensers can provide effective control of oriental fruit moth and peach twig borer, than the conventional protection programmes employed in Bulgaria. This approach to controlling oriental fruit moth and peach twig borer is in line with the recent EU recommendations that emphasize the preservation of the natural environment and production of healthy fruits, with no pesticide residues.

10. *Gandev, S. (2017). Behavior of some local and foreign walnut cultivars under the climatic conditions of South Bulgaria. Fruits 72(1), 31-35. DOI: 10.17660/th2017/72.1.3.*

Abstract

Introduction – The high protein and oil content of walnut kernels makes them essential for human nutrition. Therefore, the walnut is classified as a strategic species included in the FAO list of priority plants. The aim of the present experiment was to study and compare the agrobiological characteristics of some introduced and local walnut cultivars under the climatic conditions of South Bulgaria, as well as to define the cultivars that are perspective for growing in our

country. Materials and methods – The study was carried out on the Bulgarian walnut cultivars Sheynovo and Izvor 10, the US cvs. Serr and Hartley, the French cvs. Lara and Fernor and the Hungarian cv. Tiszacsecsi 83, grown under the ecological conditions of Plovdiv region, Central South Bulgaria. Results and discussion – The cultivars Fernor and Izvor 10 bore fruits on 80% of the lateral buds along the fruiting shoots. They are followed by 'Lara' (45%), 'Serr' (35%), 'Sheynovo' (25%), 'Tiszacsecsi 83' (15%) and 'Hartley' (10%). The mean fruit weight ranged from 10.63 g for 'Tiszacsecsi 83' to 13.62 g for 'Sheynovo'. The cumulative yield ha⁻¹ for the period 2009–2014 was 17,605 kg ha⁻¹ for 'Serr', 16,080 kg ha⁻¹ for 'Fernor' and 15,301 kg ha⁻¹ for 'Izvor 10', followed by 'Lara' and 'Hartley' (13,717 and 13,280 kg ha⁻¹, resp.). The yields were low for 'Sheynovo' and for 'Tiszacsecsi 83' (9,211 and 4,917 kg ha⁻¹, respectively). Conclusion – The Bulgarian 'Izvor 10' and the French 'Fernor' and 'Lara' can be recommended for commercial growing in South Bulgaria.

11. **Gandev, S.**, (2017). *Walnut propagation using a hot water installation and growing the obtained plants in containers. Bulg. J. Agric. Sci.*, 23 (1): 83–85

Abstract

Walnut is among the fruit species difficult to be propagated and therefore different techniques and methods have been developed all over the world to improve the survival percentage of the new plants. The aim of the present experiment was to study the possibility of walnut propagation using a hot water installation and growing the obtained plants in containers. The experiment was carried out in the period 2013-2015 at the Fruit-Growing Institute. One-year old seedlings of common walnut (*Juglans regia* L.) were used as rootstocks, grafted with 'Izvor 10' cultivar. The plants were put for callus formation in the constructed hot water installation. Successfully propagated plants were grown in containers for two years. The results show that the developed hot water installation leads to obtaining 83.1% of successfully propagated plants. It was established that the newly grafted plants could be grown in containers for two years. After the first year the average stem diameter was 14.2 mm and the average plant height 22.4 cm. In the second year of growing in the containers the plants reached an average stem diameter of 24.5 mm and an average height of 110.8 cm. The conclusion was drawn that the constructed hot water installation favoured the production of a high percentage of successfully propagated plants, which could be grown in containers for two years.

12. *Bujdosó G., S. Gандев, F. Izsépi, K. Szügyi-Bartha, V. Varjas, G. Végvári (2017). Detection and quantification of phenolic compounds of kernel of selected Hungarian and Bulgarian Persian walnut cultivars. Fruits, (in print).*

Abstract

Introduction. The Persian walnut (*Juglans regia* L.) is the most grown nutritional crop among the shell fruit species in Central and Eastern Europe. Materials and methods. Some phenolic compounds of kernel of sixteen Persian walnut cultivars derived from Hungary, Bulgaria, and France were examined during two vegetation seasons in this paper. The vanillic acid, catechin, pyrocatechin, epicatechin, rutin, cinnamic acid, gallic acid, syringic acid, and juglone were detected in the samples. Results and discussion. If the phenolic compounds are ranked into increasing order, the vanillic acid was in the first place because of its high concentration followed by catechin, pyrocatechin, epicatechin, rutin, cinnamic acid, gallic acid, syringic acid, and juglone. Conclusion. The Hungarian bred cultivars, collected in Hungary, produced higher quantity of the examined compounds than the Bulgarian bred cultivars, derived from Bulgaria, in this study.

13. *Гандев, S. and V. Dzhuvinov. (2014). Training and pruning of apple and modern trends of development - an overview. Turkish Journal of Agricultural and Natural Sciences, Special Issue: 1, 2014, 1264-1267.*

Abstract

Since Second stage of intensification of apple industry in Europe started during early of 1970`s with Dutch `Slender spindle` training system for high density plantations. Other systems such as `Vertical axis`, V and Y- shaped system, `Tatura trellis`, `Solen`, `Solax`, `Cone` etc. were developed in different countries of the world. Planting systems were classified at five group as low to ultra high density, that is since less 1000 to more than 8000 trees per hectare. According to studies in France during the last 40 years, apple tree cultivars have been classified in four group depend of their fruiting type - I type Starkrimson, II- Reine des Reinettes, III-Golden Delicious and IV-Granny Smith. This classification give us the answer why we have biennial bearing for the apple cultivars in type I and regular bearing for type IV, and why is very important to maintain good balance between vegetative growth and reproductive shoots as a part of apple canopy architecture.

14. Йовчев, И., С. Гандев (1998). Коефициенти за определяне на листната повърхност при крушовия сорт Вилямова масловка. *Растениевъдни науки*, 35(4), 286 -288.

Установлены коефициенты определения площади листовой поверхности у груши сорт Вильямс без снятия листьев с деревьев. Сравнивались коэффициенты, выведенные по три формулам. Наиболее подходящими являются коэффициенты, определенные по формулам

$$K = \frac{S}{\frac{a \cdot b}{2}} \text{ и } K = \frac{S}{a \cdot b},$$

где: \bar{S} – поверхность листьев, измеренная фотооптическим аппаратом, а – наибольшая рина, b – длина листа.

Коефициенты по этим формулам составляют соответственно 1,3549 и 0,677.

15. Гандев, С. (2005). Възможности за размножаване на ореха (*J. regia* L.) в България по метода върхно присаждане при неконтролирана температура. *Растениевъдни науки*, 42(5): 436 – 438.

Резюме:

Целта на изследването беше да се установи възможността за размножаване на ореха у нас по метода върхно присаждаен в условията на неконтролирана температура. Опитът се проведе през месец август 2003 г. и 2004 г. със сорта Извор 10, присаден върху семена от обикновен орех (*Juglans regia* L.). Процентът на получените след размножаването орехови растения през двете опитни години беше съответно 67,0% и 58,0%. Тези резултати показаха, че температурните условия през месец август у нас дават възможност за размножаване на ореха по метода върхно присаждане при споменатите условия.

16. Манолова, В., Пенев, И., Колев, К., Живондов, А., Господинова, М., Ранкова, З., Гандев, С., Попов, С. и Николова, М. (2013). Предизвикателства и очаквания на производителите на плодове – резултати от изследователски проект. *Селскостопанска наука*, 46 (№2), 15-24.

Резюме

Овощарството традиционно заема важно място в структурата на селското стопанство на България. В последните десетилетия обаче се формираха трайни негативни тенденции в сектора. Целта на статията е да се идентифицират предизвикателствата и да се предложат насоки за стабилизиране производството на плодове. На базата анализа на проблемите в сектора се препоръчва: развитие на системата за консултантски услуги; доизграждане и подобряване на пазарната инфраструктура; опростяване на

процедурите за кандидатстване по програми и намаляване на бюрокрацията. Въпреки многото предизвикателства, положителните нагласи за бъдещето на плодотрошването преобладават над негативните. Липсата на организации на производителите затруднява отстояването и защитата на интересите им. Необходимо е приемане на действени мерки за подпомагане изграждането на ефективни дребни и средни земеделски стопанства. Това би довело до стабилизиране и развитие на овощарството и генериране на доходи в селските райони.

17. Джувинов, В., К. Колев, В. Божкова, С. Гандев (2014). Архитектура на овоцното дърво при ябълка, череша и слива. *Растениевъдни науки*, № 1, 21-26.

Abstract

During the last 10 - 15 years serious research studies have started on one new direction-fruit tree architecture, i.e. on tree vigorous, form of canopy, type and age of fruiting branches, which determine quantity and quality of fruit crop. The apple cultivars are divided into four groups concerning age of the fruiting wood - Type I (Starkrimson), Type II (Reine des Reinetres;, Type III (Golden Delicious) and Type IV (Granny Smith). The most of apple cultivars bear fruits on spurs. Strong reduction of the crop from 5 and more age wood is observed. investigated sweet cherry cultivars bear fruits mainly on spurs and depending of cultivars on 5 and 7 years old braches no fruitfulness. Plum cultivars bear predominant on 2 - 4 age wood. These investigations determined which kind of pruning need to do for each cultivar depending type and age of bearing wood for obtaining high, regular and qualitative fruit crop.

18. Гандев, С., В. Арнаудов, В. Манолова, Д. Домозетова, П. Герчева, Л. Начева, С. Попов, К. Корнова, 2014. Състояние, проблеми и перспективи на производството на круши в България. *Journal of Mountain Agriculture on the Balkans*, vol. 16, 6, 1534 -1552.

Резюме

Статията прави обзор на състоянието и проблемите на крушовото производство в България и набелязва мерки, с оглед на неговото подобряване. България е малък производител на круши, но след 90-те години на миналия век родното производство се срива. От осемнадесето място в света през 1980г. с 96 хил. тона, днес производството е 1 974 t. Изтъкват се основните причини за редуциране на площите, заети с тази овощна култура, като се отделя специално внимание на използваните технологии, сортове и сорто-подложкови комбинации, начини на формиране и резитби, съпътстващите фитосанитарни проблеми, както и методите, начините и средствата за тяхното

ограничаване и контрол. Крайната цел е да се преодолеят предизвикателствата, като се предложат на производителите технологии, приложими за различните почвено-климатични райони на страната: технология за интензивно отглеждане; технология за биологично отглеждане на круша в екстензивни насаждения; технология за отглеждане на *in vitro* размножени крушови сортове, изискващи междинник, на собствен корен - без облагородяване върху подложка. В заключение са представени мерки за подобряване на крушовото производство в България.

19. Гандев, С. (2015). Основни критерии при избор на орехови сортове, подходящи за отглеждане в България. *Растениевъдни науки*, 4: 37-42.

Abstract

Choosing walnut cultivars suitable for growing in Bulgaria is of great importance for the development of walnut production in the country. The present paper describes the major criteria for their assessment. It was concluded that the cultivars to be grown in industrial walnut plantations in the country should be characterized by: moderate tree growth, late flowering period, early and lateral fruit bearing, high yields, pale coloured and fat kernels of 7 – 8 g in weight, high winter hardiness of the fruit buds, resistance or tolerance to walnut blight (*Xanthomonas campestris* pv. *Juglandis*) and anthracnose (*G. leptostyla*) and top quality oil.

20. Джувинов, В., С. Гандев (2015). Овощарството в България – историческо развитие, състояние и проблеми. *Аграрен университет – Пловдив, Научни трудове*, т. LIX, кн. 41-48.

Abstract

Fruit production in Bulgaria has passed several periods of development: 1) after the Liberation up to the Second World War (1897-1939), when the total area of orchards rose from 4,500 ha to 47,500 ha due to the increased demand on the West European market since 1925; 2) after the end of the Second World War up to 1960, when fruitgrowing developed in a typically extensive manner and the areas increased fast up to 135,800 ha; 3) the 1st stage of intensification (1960-1970) when palmette orchards were established and the use of vegetatively propagated clonal rootstocks was started. During that period the areas reached a maximum of 178,600 ha (1965) and the concentration and specialization of fruitgrowing was started; 4) the 2nd stage of intensification (1971-1980). This period is known as the super intensive (high density) plantations on moderate and dwarf clonal rootstocks, when huge orchards of different fruit crops were established; 5) under the condition of transition to market economy since 1990 up to the present day – political and economic changes and allocation of the land to the former owners. A large number of the established new orchards are of a small size, mainly about 0.5-1.0 ha.

21. Начева, Л., С. Гандев, П. Герчева, В. Иванова (2015). Възможности за присаждане на *Ginkgo biloba* L. по метода „топъл калус“. *Аграрен университет – Пловдив, Научни трудове, т. LIX, кн. 4: 137-142.*

Abstract

Ginkgo biloba L. has been used for over 3,000 years in its homeland China for food, decoration and treatment of various diseases. *Ginkgo* can be propagated by seeds, green and ripe cuttings and by grafting. A major disadvantage in the seed propagation is that the new plants are genetically heterogeneous in terms of morphological and botanical features as well as in the content of biologically active substances in the leaves. Moreover, the signs which distinguish male from female plants appear only after 15-20 years - too late for removing the fruiting trees which are undesirable for landscaping purposes because of the bad smell of the fruits. Vegetative propagation is used on the one hand for the production of clones and varieties having desirable decorative qualities and on the other hand – to produce only male trees for landscaping.

The hot callus method of grafting has been optimized for walnut and other trees at the Fruit Growing Institute in Plovdiv by a specially developed system with water heating. The objective of this experiment was to study the possibilities for grafting *Ginkgo* by this method. Annual seedlings of *Ginkgo biloba* L. were used as a rootstock. Scions of appropriate size were taken from a male tree. The cleft grafting was carried out at the beginning of March. The grafted plants were laid horizontally on the tunnels so that the place of grafting be on the heated pipeline. The roots of the plants which were found to be outside the tunnel were covered with damp sand. A temperature of 27°C (± 1°C) was maintained for 4 weeks. After that period the grafted plants were planted in pots with a peat-pearlite mixture. The non-grafted seedlings grown under the same conditions were used as a control. A very high percentage of transplanting - 75%, with very a good development of the grafted plants was reported and the one-year vegetation growth reached 20 centimeters.

22. Гандев, С., В. Манолова. (2016). Растеж, плододаване и икономическа ефективност на системите за формиране стройно вретено, солен и вертикална ос, приложени при ябълковите сортове Бребърн и Грени Смит върху подложка М9. *Journal of Mountain Agriculture on the Balkans, vol. 19, 1:158-173.*

Резюме

Опитното насаждение беше създадено на територията на Института по овощарство в град Пловдив, България, с координати 42° 9' северна ширина, 24° 45' източна дължина и 160 метра надморска височина. Изследването се

проведе през периода 2013-2015 г., т.е. трета-пета вегетация на дърветата и обхваща периода на първите три плододавания. С проведеното изследване се целеше да се проучи влиянието на системите за формиране Стройно вретено, Солен и Вертикална ос върху растежа и плододаването на ябълковите сортове Бребърн и Грени Смит, присадени върху подложка М9 и отглеждани в условията на България. Получените резултати показват, че средният и сумарният добив от ха са по-големи при формирането Вертикална ос в сравнение с получените от системите Стройно вретено и Солен. Това се дължи както на добрите репродуктивни прояви на дърветата от този вариант, така и на по-големия брой дървета на ха. Системата Вертикална ос е икономически ефективна още в началния период на плододаване за разлика от системите Стройно вретено и Солен при сортовете Бребърн и Грени Смит. За условията на страната се препоръчва формирането на сортовете Бребърн и Грени Смит върху подложка М9 да се извършва по системата Вертикална ос.

23. Гандев, С., И. Ханев, И. Станева, П. Савов, Е. Исуф, Д. Сербезова (2016). Вегетативни и репродуктивни прояви на ябълковия сорт Грени Смит върху подложка М9, формиран по системите Стройно вретено, Солен и Вертикална ос. Екология и бъдеще, XV, No. 1–2, 62-65.

Abstract

The experimental plantation was established in the territory of the Fruit-Growing Institute in Plovdiv, with geographic coordinates of 42° 9' N latitude, 24° 45' E longitude and 160 meters altitude. The study was carried out during the period 2013 – 2015, i.e. third-fifth vegetation of the trees, covering the first three fruiting seasons. The aim of the present study was to investigate the effect of the training systems Slender Spindle, Solen and Vertical Axis on growth and fruiting characteristics of the apple cultivar ‘Granny Smith’, grafted on M 9 rootstock and grown under the conditions of Bulgaria. The results obtained show that the average and cumulative yields per ha were higher when Vertical Axis training method was used compared to Slender Spindle and Solen training systems. That was due to the better reproductive habits of trees in that variant, as well as to the larger number of trees per ha. Under the conditions of our country, tree training to Vertical Axis method is recommended for ‘Granny Smith’ apple cultivar grafted on M 9 rootstocks.

24. Gandev, S., 2016. Walnut propagation – an overview. Rasteniavadni nauki (Bulgarian Journal of Crop Science), 53(4), pp. 3-10.

Резюме

В статията се прави обзор на методите за размножаване на ореха. Посочват се и се дискутират резултати от отделни експерименти. Най-голямо внимание е

отделено на присаждането на пъпка и на калем, като най-обещаващи техники за размножаване на този овощен вид. Обсъжда се и влиянието на отделни елементи - като сорт, температура и влажност, върху успеха на присаждането. Прави се заключение, че страните производителки на орехов посадъчен материал биха могли да увеличат производство си посредством комбинирането на различни методи за размножаване.

25. Gandev, S., Isuf, E. and Tsaikin, N., 2016. *Fruit distribution within walnut tree canopy depending on light exposure. Rasteniavadni nauki (Bulgarian Journal of Crop Science)*, 53(4), pp. 11–14.

Резюме

Експериментът е проведен с петнадесет годишни опитни дървета от сорт Извор 10, присадени върху подложка обикновен орех (*Juglans regia* L.) и засадени при разстояние на засаждане 10 x 10 m. Целта на проучването е да се установи разпределението на плодовете в отделните части на ореховата корона в зависимост от светлинните условия. Установено е, че плододаването при ореховите дървета не е равномерно разпределено в короната. Прави се извод, че засенчването на отделни части от короната редуцира добива само в засенчената ѝ част, което по косвен начин доказва съществуването на автономност на отделните части от короната, респективно клони. Препоръчва се за практиката при отглеждането на ореха да се провеждат ограничаващи резитби, след образуването на овощен плет.

26. Nikolova, V., Dimanov, D. and Gandev, S., 2016. *Investigating the possibilities for callus induction from walnut (*Juglans regia*) in vitro. Rasteniavadni nauki (Bulgarian Journal of Crop Science)*, 53(4), pp. 15–19.

Резюме

Проучени са възможностите за индукция на калус от различни растителни експланти при обикновен орех (*Juglans regia*) в *in vitro* условия. Като източник на растителни експланти са използвани сегменти от листа и стъбла от млади едногодишни растения. Изследвани са три хранителни среди, върху които е индуцирана калусна тъкан. Проучването е извършено в периода май – декември 2016 г. в Производствената лаборатория за *in vitro* размножаване в Института по овощарство – Пловдив. Резултатите показват, че при листни сегменти калусна тъкан се индуцира на среда DKW (Driver and Kuniyuki, 1984) с 1 mg/l BAP и 3 mg/l NAA (АНО), както и на среда K1 (Диманов, 1987) с 2 mg/l BAP и 6 mg/l NAA. При двете среди калусът започва да се оформя след 15-тия ден. Индукцията на калус от стъблени клетки върху среда DKW започва след 17-тия ден.

27. Dimova, M., M. Titjnov, V. Arnaudov, S. Gандев (2014). Harmful Effect of Cherry Leaf Spot (*Blumeriella jaapii*) on Sour Cherry and Influence on Fruit Yield. *Агрознање*, 15(4), 393-400.

Abstract

The experiment was carried out in 2007-2012 in a sour cherry orchard with three cultivars – ‘Oblachinska’, ‘Schattenmorelle’ and ‘Heiman Ruby’- established in the region of the town of Hisar. In 2007 the control of cherry leaf spot (*Blumeriella jaapii*) was conducted at improper time and inaccurate rates. That induced leaf defoliation in August. In the next vegetation periods (2008-2012) the control of cherry leaf spot was carried out by applying fungicides at definite rates at the most critical time for the host-pathogen system. During the next years (2009-2012) the trees of ‘Oblachinska’ cultivar yielded normally – 1300 kg/dekar, while the trees of the other two cultivars started improving their health status and the yield gradually increased, reaching up to 1600 kg/dekar (da) for ‘Heiman Ruby’ and 1100 kg/da for ‘Schattenmorelle’.

28. Kutinkova, H., S. Gандев, N. Palagacheva, V. Dzhuvinov, B. Lingren. 2017. Ecological approach for control of *Cydia molesta* Busck and *Anarsia lineatella* Zell. using pheromone dispensers. 52nd Croatian and 12th International Symposium on Agriculture | February 12-17, 2017 | Dubrovnik, Croatia.

Abstract

Trials were carried out in the years 2014-2015 in an isolated peach orchard of 1 ha in the Fruit Growing Institute, Plovdiv – Central South Bulgaria. Mating disruption (MD) was tested as an alternative method for controlling oriental fruit moth (OFM), *Cydia molesta*, Busck and peach twig borer (PTB) *Anarsia lineatella*, Zell. from post-bloom until harvest. CIDETRAK® OFM/PTB pheromone dispensers were installed before the start of OFM and PTB flights. PHEROCON® VI Delta traps with changeable sticky liners were used to monitor target insects in this experiment. The pheromone dispensers, traps and lures are products of Trécé, Inc. USA. A conventionally managed orchard was used for reference. And 4-7 insecticide treatments were applied to control oriental fruit moth, peach twig borer, aphids and other pests. The fruit damage in the reference orchard by OFM ranges from 3.4 to 3.6 % and by PTB from 1.2 to 2 % in the successive years. The percentage of damage in the orchard treated with Cidettrak® OFM/PTB was 0.1 and 0.2 %, by OFM and 0.1% by PTB, or significantly below the economic threshold. Therefore, the MD method, with use of the CIDETRAK®OFM/PTB dispensers, proved to be an effective means of control even in a small size orchard lots. The results obtained may open the possibilities of practical use of the method of mating

disruption in Bulgaria. This method should favour preservation of the natural environment and enable production of healthy fruits, not polluted by chemicals.

29. Домозетова, Д., С. Гандев (2014). Използвани системи за формиране и резитба при ябълката в България. II-ра Научна Конференция с Международно участие „Теория и практика в земеделието“. 22-24.11.2013, Юндола, България, 170-184.

Abstract

The article gives an overview for training system shapes of apple that are applied in practice. Pruning operation that characterize a certain shapes are described in details. Traditional systems suitable for semi-mountain cultivation are presented shapes – Modified Central Leader, Central Leader, Modified Vase (Open Centar) and Free Bush. Pruning tree shapes for the intensive growing of apple are Slender Spindle, Cone, Vertical Axis and “Solen” system, as they are recommended for fertile soils. It is concluded that choosing a shape in a particular region of the country depends on the desired level of intensification and soil conditions of the area.

е. раздели в монографии

30. Гандев, С. (2013). Методи за размножаване на ореха. Орех – монография, редактор В. Джувинков, Биофрут БГ ЕООД – Пловдив.
31. Гандев, С. (2013). Създаване на орехови насаждения. Орех – монография, редактор В. Джувинков, Биофрут БГ ЕООД – Пловдив.
32. Гандев, С. (2013). Системи за формиране и резитба при ореха. Орех – монография, редактор В. Джувинков, Биофрут БГ ЕООД – Пловдив.
33. Гандев, С. (2013). Перспективни за страната сортове. Орех – монография, редактор В. Джувинков, Биофрут БГ ЕООД – Пловдив.

Монографията съдържа всички основни направления за ореховото производство по света и у нас. Описани са ботаническата характеристика, произхода на вида, генетичните ресурси, селекцията и генетиката на ореха, както и съвременните биотехнологични подходи при размножаването му. Отделено е внимание на биологичните особености и изисквания към екологичните условия на този овощен вид. Описани са съвременните орехови сортове и подложки, както и изискванията за създаване и отглеждане на съвременни орехови насаждения. За опазване на реколтата от болести и неприятели за първи път са описани освен конвенционалните методи, също така и биологична методи и средства за борба с тях.

34. **Гандев, С.** (2014). *Системи за формиране и резитба на семковите овощни видове – ябълка, круша и дюля. Формиране и резитба на овощни дървета и храсти – монография, редактори: В. Джувинов и В. Божкова. Биофрут БГ – ЕООД – Пловдив.*

35. **Гандев, С.** (2014). *Системи за формиране и резитба на орехоплодните овощни видове – орех, бадем и лешник. Формиране и резитба на овощни дървета и храсти. Редактори: В. Джувинов и В. Божкова. Монография. Биофрут БГ – ЕООД – Пловдив.*

Настоящата монография е предназначена за всички, които се занимават с овощарство от професионален или любителски интерес и желаят да усъвършенстват своите познания в тази област.

В нея са представени най-прилаганите системи за формиране и резитба при овощните видове. Успоредно с това са застъпени и някои нови формировки, които са в процес на въвеждане в производствените насаждения у нас. Ние следваме пътя на логиката, за да се стигне до конкретното решение – каква резитба да се прилага на всяко дърво или храст от даден овощен вид. Натрупаните знания ще Ви бъдат полезни при вземането на правилните решения при всеки конкретен случай.

36. **Гандев, С.** (2016). *Създаване на ябълкова градина. Ябълка – монография, редактор В. Джувинов, Биофрут БГ ЕООД – Пловдив.*

37. **Добревска, Г., С. Гандев,** (2016). *Препоръчителна гъстота на засаждане при създаване на съвременни ябълкови насаждения с клонови подложки. Ябълка – монография, редактор В. Джувинов, Биофрут БГ ЕООД – Пловдив.*

38. **Гандев, С., Г. Добревска,** (2016). *Системи за формиране и резитба. Ябълка – монография, редактор В. Джувинов, Биофрут БГ ЕООД – Пловдив.*

39. **Гандев, С.** (2016). *Регулиране на плододаването – прореждане на цветове и завързи. Ябълка – монография, редактор В. Джувинов, Биофрут БГ ЕООД – Пловдив.*

Монографията съдържа всички основни направления за ябълковото производство по света и у нас. Описани са ботаническата характеристика, произхода на вида, генетичните ресурси, селекцията и генетиката на ябълка, както и съвременните биотехнологични подходи при размножаването ѝ. Отделено е внимание на биологичните особености и изисквания към екологичните условия на този овощен вид. Описани са съвременните ябълкови сортове и подложки, както и изискванията за създаване и отглеждане на съвременни ябълкови насаждения. За опазване на реколтата от

болести и неприятели за първи път са описани освен конвенционалните методи, също така и биологична методи и средства за борба с тях.

40. **Gandev, S.** (2014). *Following walnut footprints in Bulgaria. In: Following Walnut Footprints – Cultivation and Culture, Folklore and History, Traditions and Uses, Ed. D. Avanzato. Published by ISHS (ScriptaHorticulturae), Belgium.*

This book reports the status of the walnut industry country by country. Information is given on the geographical distribution of the species of *Juglans*, their historical origins and their introduction into different countries. Also presented are techniques of cultivation of the Persian walnut, information on native varieties, as well as commercial data.

41. **Gandev, S.** (2009). *Walnut propagation in Bulgaria. Walnut propagation training short course, Cost Action 873 – ‘Bacterial Diseases of Stone Fruit and Nuts’, Murcia, Spain, March 10-12, p.8-9.*

In Bulgaria the production of walnut grafted planting material started in the 70-ies of the last century. Patch budding was used and a technology was developed adapted to the climatic conditions in the country. Rootstocks are produced from fruits of common walnut (*Juglans regia* L.) directly planted in a nursery at the end of October or put for stratification and after that planted in spring. Planting distance is 100 cm between the rows and 20 cm space between the plants within the row. Patch budding is used leaving 1-1,5 mm looseness. The most favourable period for walnut grafting under the climatic conditions of the country is from 20 August till 5 September. At the end of November the grafted rootstocks are earthed up, the buds being covered with a soil layer of 20-25 cm thickness. In spring after the risk of frosts has passed, the grafted plants are uncovered. The wild part is pruned and the binding strip is removed. At the end of the vegetation the grafted trees reach a height of about 150 -180 cm and a graftage thickness of 2-2,5 cm. Immediately after grafting, 70-80 % of callus-formed plants are obtained, the percentage decreasing significantly under the effect of the low winter temperatures. During the last four years the percentage of successfully propagated plants at the end of the second year (before taking out the trees from the nursery) was within 33 % and 47 %.