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# GENERAL PROGRAMME

## 15-16 JUNE 2023, Craiova, ROMANIA

Date	Event	Location
<b>Thursday 15.VI.2023</b>	<b>Reception of participants (16.00-18.00)</b>	<b>Faculty of Agronomy (19 Libertății street)</b>
<b>Friday 16.VI.2023</b>	<b>Registration (10.00-10.30)</b>	<b>Faculty of Agronomy (19 Libertății street)</b>
	<b>Opening Ceremony (10.30-11.00)</b>	<b>Aula "Alexandru Buia" - Faculty of Agronomy (19 Libertății street) Cultural moment -artistic program „Marin Sorescu High School of Arts,,</b>
	<b>Plenary Session (11.00-13.30)</b>	<b>Faculty of Agronomy Aula "Alexandru Buia" - Faculty of Agronomy (19 Libertății street)</b>
	<b>Lunch (13.30-14.30)</b>	<b>Faculty of Agronomy, 1st floor</b>
	<b>Plenary Session (13.30-18.00)</b>	<b>Aula "Alexandru Buia" - Faculty of Agronomy (19 Libertății street)</b>
	<b>Award ceremony 17.30-18.30</b>	<b>Aula "Alexandru Buia" - Faculty of Agronomy (19 Libertății street)</b>

## PLENARY SESSION

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## MICROLOCALITY EFFECTS ON AGROBIOLOGICAL CHARACTERISTICS OF PROKUPAC CV BT 1 AND BT 2CLONES

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**Key words:** *Prokupac, clone, agrobiological characteristics, microlocality*

### Abstract

Prokupac is the most widespread autochthonous grape variety in Serbia. Except in Serbia is grown in North Macedonia and in smaller percent in Bulgaria and Russia. The

variety is also known by synonyms: *Kameničarka*, *Rskavac*, *Nikodimka*, *Crnka*, *Prokupka*, *Zarčin*, *Skopskocrno*, *Majskičornietc*. Prokupac is used for production of rose, high quality red wines and for coupage with other grape varieties.

The aim of study is to show effect of ecological factors on agrobiological characteristics of two Prokupac clones BT 1 and BT 2 such as: developed vegetative mass, development of winter buds, number of developed clusters and yield as well as mechanical composition of grape berries and chemical characteristics of grape juice in microlocality of Pavlovci in Srem region, Serbia. For the purpose of study 10 vines of both clones were examined separately.

Vegetative mass was determined by mass of pruned shoots. Beginning and duration of the phenological stages were determined by Lorenz et al. (1994) method. Fertility was determined by interflorescens counting at the beginning and end of flowering.

Mechanical composition of cluster and berries was determined by Marković and Pržić (2020) method. Sugar content in the grape juice-must was determined using Oeschlemostwage and total acid content was determined with titration method using 0.1M NaOH. Clone BT 1 had greater average mass of pruned shoots (291.5 g) compared to clone BT 2 (227.0 g).

Bud bursting were 24.4. without significant difference between two clones. Clone BT 1 started flowering earlier on 6.6. while clone BT 2 started flowering on 10.6. Average yield was higher for clone BT 2 (1.95 kg/vine) in comparison to clone BT 1 (1.76 kg/vine). Mechanical composition of clusters and berries was as following: clone BT 2 had greater average cluster mass (172.6 g) while clone BT 1 had average clusters mass of (112.8 g). Average number of berries in a cluster for clone BT 1 was (77.6) and for clone BT 2 (75.2). Average berries mass in cluster was greater for clone BT 2 (165 g), average skin mass in 100 berries was higher for clone BT 2 (13.9g).

Percent of berries in clusters and percent of mesocarp in berries was the same for both clones (96 and 92%). Percent of berries skin was higher for clone BT 2 (5.5%) and percent of seeds in berries was higher for clone BT 1 (2.6%). Sugar content in grape must was greater for clone BT 2 (24.1%) in comparison to clone BT 1 (19.9%).

Total acid content was for clone BT 2 4.5g/l and for clone BT 1 4.13g/l. Based on results of Prokupac clones BT 1 and BT 2 in the locality in Pavlovci it can be concluded that clone BT 2 had greater average yield per vine and higher sugar content in berries and as such is a better clone for growing and high quality red wines.

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## STUDY OF THE WOODY PLANT COMMUNITIES IN THE AREA OFTÂRNOVUL MARE MOUNTAIN, VÂLCEA COUNTY

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**Key words:** *woody plant communities, Târnovul Mare, natural habitats*

### **Abstract**

Târnovul Mare Mountain, a great landscape beauty, lures the steps of man, either the tourist or the researcher, through the precipitous rock walls, through the tumultuous symphony of cataracts, but also through the floristic and faunistic richness of the lands they cross. Man has intensely influenced and still influences, through his activity, the environment in which he lives. Current scientific research has the duty to draw attention to the need to protect nature, to exploit it rationally in order to preserve it for future generations as well. The researched territory is located in the north-west of Oltenia, on the territory of Vâlcea County and is an integral part of Târnovu Mare - Latorița Natura 2000 Site was declared a protected natural area of community interest following the identification on its territory of 10 types of natural habitats of community interest. Târnovul Mare Mountain is richly dressed in the vegetation characteristic of the Carpathian chain. The *Larix decidua* and *Fagus sylvatica* forests dominate the foothills of Târnovul Mare Mountain. In dense clusters, on more stony slopes or in the clearings from the peaks, the slender trunks of the birch rise, contributing through its white color to the polychromy of the landscape. The forests of *Picea abies* are found in the territory researched. Among the conifers we can mention the following species: *Pinus silvestris* and *Abies alba*. The juniper bushes are spread over quite large areas forming the plant community (Mountain peony) - *Rhododendromyrtifolii* - *Pinetum mugo* (Juniper) Borza 1959 em. Coldea 1985. As a result of the researches carried out, 13 woody plant communities were identified, grouped in 5 classes. Approx. 200 surveys, which were systematized and grouped in phytosociological tables.

In the researched territory there is a woody vegetal association specific to this area of our country, more rarely spread in the rest of the country: *Ass. Saxifraga cuneifoliae-Laricetum* (Beldie 1967) Coldea 1991.

They fall within the Natura 2000 - 9420 forest habitat “*Larix decidua* alpine forests and/or *Pinus cembra*” [Alpine *Larix decidua* and/or *Pinus cembra* forests] (CLAS. PAL.: 42.31, 42.32 and 42.35).

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## INFLUENCE OF AGROECOLOGICAL LOCALITIES CONDITIONS ON UVOLOGICAL AND TECHNOLOGICAL CHARACTERISTICS OF BAGRINA VARIETY

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**Key words:** *Bagrina, locality, uvological and technological characteristics, grape, quality*

### **Abstract**

During the last few years, the reputation of less cultivated grape varieties has grown significantly. Today, Bagrina variety is not grown only in Serbia, but also in Serbia/Romania border zone, where it is found under the synonym Bragina, Braginarosiu (Romania synonyms). Experiments have been set up in ampelographic collection of Institute of viticulture in Sremski Karlovci and on a privately-owned vineyard in village Arbanasce, Prokuplje. Bagrina were grafted on rootstock Kober 5BB. Aim of this paper was to determine technological characteristics of rarely represented variety Bagrina and to confirm possibility of its return to actual grapevine assortment of Serbian, as well as to give recommendations for next breeding programs. For examination of structural indicators of berry and chemical content of grape juice were selected 10 vines. Vines were uniformly pruned (a two buds per spur and 12 buds per arc were left). Guyot training system was used. The examined structural indicators were, as follows: weight of 100 berries, weight of skin in 100 berries, weight of seeds in 100 berries, weight of 100 seeds and number of seeds in 100 berries, length and width of berries. Chemical composition of grape juice were represented through sugar (%), total organic acid content (g/l) and pH value. For the examined traits, mass of 100 berries (250.2

g), mass of the skin in 100 berries (10.38 g) and mass of seeds of 100 berries (5.90) were found to be higher for Sremski Karlovci than in Prokuplje. Significant differences were found when examining characteristics like number of seeds in 100 berries, with a higher value (196) at the site in Prokuplje. A strong correlation was found between percent of berry skin and percent of seed mass in berry. The higher sugar content in grape juice was determined in grape from Sremski Karlovci locality (20.6%) and lower value for Prokuplje locality (19.8%). Based on the in grape juice, In grape juice Bagrina had a lower content of total organic acids (4.73 g/l) in Prokuplje. Based on results of mechanical composition of berry and chemical composition of grape juice it can conclude that Bagrina at Sremski Karlovci locality showed better results compared to other localities, and can be recommended for growing in these and other localities with similar or same agroecological conditions.

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## **MODERN PLANT PROTECTION AND APPLICATION OF GOOD AGRICULTURAL PRACTICES IN FRUIT GROWING**

**Author Damyan DAMYANOV<sup>1</sup>, Veselin ARNAUDOV<sup>1</sup>**  
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**Key words:** *Fruit growing, Integrated fruit production, Pest control, Human health and environmental protection*

### **Abstract:**

This report considers the main technological elements in the realization of the Integrated Fruit Production (IFP) as a modern approach of obtaining high quality, cost-effective and environmentally friendly fruit products, garnishing human health and environmental protection. IFP is implemented through the usage of good agricultural practices throughout the fruit production chain; from the orchard to their storage, packaging and sale in the trade network, incl. - selection of a place for planting a new orchard; selection of variety, rootstock and planting distance; appropriate pruning and method of formation; way of maintaining the



soil surface; science-based fertilization and watering; implementation of efficient and environmentally friendly protection of fruit crops against diseases, pests and weeds, giving priority to natural, agro-technical, genetic and biotechnical methods of pest control, while the use of chemicals is kept to a minimum. IFP is a modern, environmentally friendly production that aims to minimize the negative side effects of the use of agrochemicals and to ensure the protection of human health and the environment. Knowledge of its principles is essential for faster adaptation of Bulgarian fruit growing to the modern requirements of the European market and obtaining healthier fruit products

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## **RESEARCH REGARDING THE ACHIEVEMENT OF THE QUALITATIVE PARAMETERS OF WORK ON SEEDLING PLANTING MACHINES**

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**Key words:** *planted seedlings, quality parameters, efficiency*

### **Abstract:**

This paper presents some research on the achievement of qualitative parameters of work by seedling planting machines, especially the position of the seedling from the vertical, the degree of plant damage and planting mistakes, defining parameters for evaluating the planting work. The mechanized planting work is done, in overwhelming proportion, with semi-automatic machines or with automatic machines to a lesser extent. Depending on the constructive and functional solutions and the planting conditions (type and condition of the soil, working speed, and skill of the operator) different degrees of fulfillment of the qualitative working parameters mentioned above are obtained. It turned out that the solution with a planting machine with rotary bucket distributors meets a higher percentage of qualitative working parameters, especially the vertical position at planting and the degree of damage. These types are also found in two constructive variants, namely: with articulated

bucket dispenser, which places the seedling in a gutter, opened by a coulter, and with non-articulated bucket dispenser, which places the seedling directly in the soil.

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## **BIRD LOCAL POPULATION CONDITION AS AN INDICATOR FOR SUSTAINABLE DEVELOPMENT OF GREEN POWER PROJECTS IN THE BALKAN PENINSULA**

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**Key words:** *Wind Generators, Birds, Monitoring*

### **Abstract**

There are many reasons why it can be assumed that the production of electricity from wind turbines and photovoltaic panels will account for an increasing share of total energy production in the coming decades. The great advantages of these two types of production are related to the possibility of a short supply chain; independence from the feedstock for production; low price for the construction and during operation; easy control over the production process, etc.

The Balkan Peninsula preserves most of Europe's wildlife. Due to its specific relief and probably mostly for political and economic reasons, wildlife in this part of Europe is the best preserved. Including the species diversity of animals and plants, as well as the diverse habitats are an indisputable fact. This requires a responsible approach to wildlife and engages local communities with precise planning of their investment intentions in this area.

There is enough information about the impact of wind turbines on birds (especially on birds of prey and waterfowl). Their effect on bats is similar. And perhaps most significant it is on migratory birds and bats. The impact of photovoltaic plants on habitats and in terms of mid-life change of rare and endemic plant species is also known. These influences impose serious commitments on the planning process for the construction of wind and photovoltaic power plants on the Balkan Peninsula.

The mechanisms for assessing the impact of an investment intention for the future construction of wind or photovoltaic power plants impose a process of in-depth collection of information on the state of the environment within the scope of each investment project. The information shall include studies on the status of nesting, migratory and wintering species of birds and bats in the areas affected by an investment intention. They also require an assessment of the condition of the habitats and studies on the condition and distribution of plant species that would be affected by the construction of photovoltaic (sometimes also wind) power plants.

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## THE DIVERSITY OF MACROMYCETES IN THE SURROUNDINGS OF RÂNCA RESORT - GORJ COUNTY

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**Key words:** *macromycetes, Parang Mountains, biodiversity*

### **Abstract**

The researched territory is one of the most spectacular areas in the Parang Mountains, with wooded and rounded peaks, but also attractive areas for those who want to practice winter sports.

The present paper aims at presenting and analyzing the macromycetes from the surroundings of Rânca in Gorj County, as well as their chorology, ecology, their economic importance.

The mycological flora in the surroundings of Rânca Resort is very rich and diverse in its composition, most cryptogams finding in this area the most favorable conditions for their development.

In the researched territory, 64 species of macromycetes were identified, belonging to a number of 41 genera and 23 families. Taking into account the biological forms, the results obtained show that the highest percentage is held by mycetogeophytes (51.57%), followed by xylic mycetoepiphytes (37.50%), arboreal mycetoepiphytes (7.81%) and terrestrial mycetoepiphytes (3.12%).

From the point of view of ecological groups, the predominance of wood saprophytes (32.81%) was followed, followed by mycorrhizal species (26.57%), humic saprophytes (18.75%), lignic saproparasites (15.62%) and follicular saprophytes. (6.25%). Most species are inedible (56.25%), followed by edible ones (29.69%).

Poisonous species have the lowest percentage (14.06%).

For each species, the ecological group, biological form, substrate, collection period, location and whether the species is edible, inedible or poisonous were noted. Among the frequently encountered species we can mention: *Stereum hirsutum*, *Trametes hirsuta*, *T. versicolor*, *Craterellus cornucopioides*, *Schizophyllum commune*, *Lactarius piperatus*, *Russula cyanoxantha*. The edible species found in the researched territory have a rather high percentage, among them we can list: *Fistulin hepatica*, *Macrolepiota procera*, *Craterellus cornucopioides*, *Lactarius piperatus*, *Russula cyanoxantha*, *R. vesca*, *R. virescens*, *Armillariella mellea* and others.

Particular attention must be paid to the protection and conservation of biodiversity, as the researched territory is located in an area where there is overexploitation.

Last but not least, with regard to the protection and conservation of biodiversity, we must pay special attention to tourism and overgrazing.

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## **ORGANIC FARMING. WHY ORGANIC FARMING SHOULD BE DEVELOPED IN BULGARIA**

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**Key words:** Organic farming, Goals, Principles, Rules, Soils degradacion

### **Abstract**

This review article discusses the specifics of organic farming. Its goals, principles and rules of organization are stated.

Organic farming is considered as a complete innovative system of agricultural production with a full production cycle that runs in unison with natural laws. The article states that the regulations for the development of this agriculture in Bulgaria follow the approved

regulations and documents of the European Union. In this regard, since 2007, the country is constantly changing and improving its legislation in the field of organic farming.

By presenting information on the state and development of organic farming in Bulgaria, the authors of this article expect:

- to enrich the information of young specialists and students in the field of organic farming;
- to encourage young people and farmers in their desire to focus on organic farming.

As important arguments in this regard, the authors point out the possibilities of organic farming to improve the environment, the economic incentives of this production as an alternative activity, the strong social effect and the support of the European Community.

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## **ROOTSTOCKS INFLUENCE ON AGROBIOLOGICAL AND TECHNOLOGICAL CHARACTERISTICS OF TWO CABERNET SAUVIGNON CV CLONES**

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**Key words:** *Cabernet Sauvignon, clone, agrobiological characteristics, wine*

### **Abstract**

Cabernet Sauvignon is one of the most common and old varieties in the world. In the total wine assortment ranks second with a total of 341,000 hectares, or 4% of the world's area under vineyards. It is originating from Bordeaux, France. It is cultivated and used in most world countries for high quality wines production. By latest OIV data distribution of Cabernet Sauvignon plantations in the world show that France is on first place with 46,555 hectares, followed by Chile (42,409), the United States (40,837) and China (40,300).

The research was carried out during 2021 year at Šumadija region, vineyard area Krnjevo. Aim of this study was to determine differences between Cabernet sauvignon cv

clones 191 and 412 under the influence of rootstock 101-14. Duration of phenological stages was determined by Lorenz et al. (1994). Shoots growth measuring was done in three repetitions on 15 days interval. Fertility was determined by inflorescences counting at the beginning and end of flowering. Mechanical composition of grape and berry was determined by Marković and Pržić method (2020). Sugar content of grape must was analyzed using Oechsle mostwage and total acid content was determined by titration method using 0.1M NaOH. Physico-chemical wine analysis was done by standard OIV methods. For sensory vine evaluation was used scale up to 20 points.

There were no differences in duration of phenological stages between clone 191 and clone 412. Clone 191 had the average shoot growth of 130.62 cm, while clone 412 had average shoot growth of 144.30 cm. Clone 191 in average had 13.5 differentiated inflorescences and 13.4 developed bunches per vine compared to clone 412 which had in average 12.75 differentiated inflorescences and 12.6 developed bunches per vine. The yield per vine varied for clone 191 in range from 1.754 to 2.158 kg, and for clone 412 it ranged from 1.041 to 1.784 kg.

In terms of grape and berries ampelographic composition clone 191 had a higher average grape weight (147.6 g), average berries number in bunch (151.5 g), average berries weight in bunch (140.6 g), average stem weight (5.2 g), average bunch length (13.3 cm), average bunch width (6.9%), weight of 100 berries (117 g), weight of skins from 100 berries (9.3239 g), weight of seeds from 100 berries (6.3239 g), number of seeds in 100 berries (206), percent of berries skin in bunch (9.59%), percent of seeds in bunch (6.49%) and skeleton bunch (13.11%) in relation to clone 412 which showed a higher weight of 100 seeds (3.055 g), percent of stem in bunch (4%) and percent of mesocarp in bunch (82.82%).

Sugar content in grape juice (must) was higher for clone 191 (25.09%) compared to clone 412 (23.76%). Clone 412 had a higher content of total acids (7.6 g/l) relative to clone 191 (6.8%). Total acids in wine were lower for clone 191 (6.38%) and higher for clone 412 (7.13 g/l). Clone 191 had 14.4% vol. alcohol content in wine and clone 412 had 13.9% vol.

In sensory evaluation of wine, both clones were rated with 2 points for color and clarity, while clone 191 had a lower rating (6 points) on fragrance compared to clone 412 (7.3 points), as well as a lower rating on taste (7.2 point) compared to clone 412 (7.8 points). Clone 191 had an overall rating of 17.2 points, and clone 412 had an overall rating on 19.1 points out of maximum of 20.

Based on research and obtained results it was found that clone 191 stood out in regard to the potential yield capacity, ampelographic characteristics qualitative parameters of grape juice (must), wine and sensory evaluation relative to the clone 412. Based on sugar and

acid content of both clones, it can be concluded that both clones satisfy the standards for production of high quality red wines.

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## INFLUENCE OF GRAPE MATURITY ON CONTENT OF SOME PHENOLIC COMPOUNDS IN WINE

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**Key words:** *phenolic compounds, grape ripening, veraison, wine*

### Abstract

In recent years, phenolics are of special interest, due to their beneficial effects for human health. Furthermore, phenolic compounds are extremely important constituents of grapes because of the quality parameters to which they contribute greatly. They include the nonflavonoids (hydroxybenzoic and hydroxycinnamic acids and stilbenes) and flavonoids (anthocyanins, flavan-3-ols and flavonols). Anthocyanins are responsible for the colour of red grapes. Flavan-3-ols are responsible for the astringent taste sensation of grapes. Different factors such as phenophases of ripening, irrigation, soil type, and topography exert positive or negative effects on the content and composition of certain grape polyphenols. The aim of this work was to study how grape maturity affects on content of different phenolic compounds in wine. Grapes variety Cabernet Sauvignon were harvested in three different stages of maturity: veraison, optimal enological maturity and overripeness, which originated from vineyards belonging to experimental field "Radmilovac" of the Faculty of Agriculture in Zemun, University of Belgrade (Serbia). The grapes of veraison stage were harvested at last week of August. After this stage grapes were harvested at optimal enological maturity at first week of October. Three weeks after optimal enological maturity, grapes were harvested at overripeness stage. Grapes crushing and destemming were followed by sulfitation with 10 g of K<sub>2</sub>S<sub>2</sub>O<sub>5</sub> per 100 kg and inoculation of yeast strain *Saccharomyces cerevisiae* in the amount of 20 g/hl (BDX, Lallemant, Canada). Alcohol fermentation with maceration lasted 21 day at

temperature of  $25\pm 3^{\circ}$  C using the “pigeage” system (mechanically punching down). After that pomace was separated and obtained wine samples were bottled and stored until analyses. Caffeic acid, gallic acid and *trans*-resveratrol were quantified using a LC- MS/MS system (Agilent LCTQ 6495C Triple Quadrupole). Prior to analyses, wine samples were prepared by solid phase extraction (SPE). The highest concentration of gallic acid ( $5.18\pm 0.20$  mg/l) and *trans*-resveratrol ( $0.58\pm 0.04$  mg/l) were measured in wine derived of grapes which were at first stage of maturation (vèraison). Gallic acid was least present in overripe grape wine and it was  $1.59\pm 0.15$  mg/l. Caffeic acid was reached the highest value in grape wine of optimal enological maturity and after that was observed low concentration in overripe grape wine. There was no statistical significant difference in content of analyzed phenolic compounds in wine samples that derived from grapes at different maturation stages.

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## STUDY ON FLORA AND SINANTROPIC VEGETATION ENCOUNTERED IN SURROUNDINGS OF SEGARCEA (JUD. DOLJ)

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**Key words:** *floristic composition, ruderal species, geobotanical*

### **Abstract**

The studied territory is located in the vicinity of Segarcea - Jud. Dolj and covers an area of about 250 km<sup>2</sup>. The present paper aimed at the complex analysis of the synanthropic vegetation, as well as the chorology, ecology, physiognomy and floristic composition, the economic importance and the dynamics of the described vegetal associations. The species of ruderal and segetal plants found in the vicinity of Segarcea are grouped into the following categories: perennial and annual monocotyledonous and dicotyledonous weeds from straw crops, perennial and annual monocotyledonous weeds from hoe crops, ruderal species along weed communication routes, vineyards and invasive vegetable gardens.



Following the geobotanical research carried out in the vicinity of Segarcea, a number of 16 segetal and ruderal vegetal associations were identified, grouped in 3 classes, 7 orders, and 9 alliances.

Of the 16 synanthropic plant associations identified, the most widespread pests are: *Echinochloo – Polygonetum lapathifolii* Soó et Csürös 194, *Digitario sanguinalis - Galinsotetum* Becker 1941, *Echinochloo – Setarietum pumilae* Felföldy 1942 em. Mucina 1993, *Amarantho – Chenopodietum albi* Morariu 1943, *Xanthio spinosae-Amaranthetum retroflexi* Morariu 1943, *Chenopodio – Xanthietum strumarii* (Timár 1947) I. Pop.

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## OPPORTUNITIES FOR PEST CONTROL IN CORIANDER IN BULGARIA

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**Key words:** *Coriander, Coriandrum sativum, diseases, insects, control*

### Abstract

Coriander, *Coriandrum sativum*, is an erect annual herb in the family *Apiaceae*. All parts of the coriander plant are edible, but the fresh leaves, dried seeds and oil are most commonly used. In recent years there has been a tendency to increase the area with this crop in Bulgaria, as in 2021 they exceed 21000 ha with an average yield of 953 kg/ha. The quantity and quality of coriander yield is determined by many abiotic and biotic factors, among which diseases and insects are essential. The purpose of this study is to provide information about the key pests of coriander in Bulgaria (symptomatology, causal agent, conditions for disease development, damage and biology of insects), as well as methods to control them according to the concept of Integrated pest management.

Key diseases of coriander for the country are: cucumber mosaic (*Cucumber mosaic virus*), bacterial blackening of the fruit (*Xanthomonas campestris* pv. *coriandri*), cercospora (*Cercosporacoriandri*), ramularia (*Ramularia coriandri*), white mold (*Sclerotinia* sp.), grey mold (*Botrytis cinerea*). Unfortunately, in the list of authorized fungicides in Bulgaria there is

only one commercial product based on *Bacillus amyloliquefaciens* (formerly *subtilis*) str. QST 713, registered against grey mold, white mold, bacterial diseases and powdery mildew.

Studies on coriander insects in the country are limited. Coriander seed wasp (*Systole coleandri*) is mentioned as the main key insect, followed by aphids (*Aphididae*), cutworms (*Agrotis* sp.) and root knot nematode (*Meloidogyne* spp.). An insecticide is approved for use against aphids based on fatty acids (unsaturated potassium salts of fatty acids).

The complex of measures for control of coriander pests includes: use of resistant varieties and / or healthy sowing material; 2-3 years crop rotation; optimal sowing dates and sowing density; optimal fertilization; weeds control; timely harvesting. Proper implementation of all these measures is extremely important in pest control, given the limited opportunities for chemical control.

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## **CONTRIBUTIONS REGARDING THE IMPROVEMENT OF WHITE CABBAGE CULTIVATION TECHNOLOGY FOR EARLY PRODUCTION**

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**Key words:** *early crop, mulch, Agryl*

### **Abstract**

In order to obtain high-performance yield, crop technology can be improved by various modern methods, but with minimal expenses that do not charge the cost price. Getting the harvest early is the main goal of vegetable growers. Early yield and marketed at a better price positively influence the profitability of the farm. Often, the time of establishment is limited by climatic conditions and early planting is possible only in protected areas. Until now, low film tunnels were used and in the recent years Agryl cover has been used more and more, for an increase in temperature. In this sense, the objective of the present study refers to the influence of some methods of protection against frost to the early crop white cabbage, in the ecosystem of southern Romania. The studied variants were: V1-mulch and without double

protection, the experience control; V2-mulch and plastic tunnel; V3-mulch + Agryl; V4-mulch + Agryl tunnel and thermal foil. During the experiment it was followed the evolution of temperature and light intensity in the studied variants and the productivity of plants. The temperature was determined with an indoor thermometer to accurately measure the ambient temperature in the solarium, with a measuring range from -30°C to 50°C. Light influences the growth and development of plants through intensity (lux), duration and wavelength. The HI97500 PORTABLE LUX METER was used to measure the light intensity. Results indicate that in variant with mulch and without protection it were registered highest values for light intensity and lowest for temperature.

Best experimented variant was that where it was applied mulch and Agryl protection which registered optimum values for temperature and light intensity and also for yield.

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## **FIRST RESULTS OF PROJECT "EXPERIMENTAL RECOVERY PROCESSES OF PRIORITY HABITAT 62C0 \* "PONTO-SARMATIAN STEPPE IN THE KALIAKRA AREA"**

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**Keywords:** *Ecological restoration, Steppe habitats, Damaged terrains, Ecosystems, Ponto-Sarmatian steppes.*

### **Abstract**

In the European Union, natural habitat 62C0\* Ponto-Sarmatian steppes is limited in its range and occurs only in two member states - Bulgaria and Romania. This grassland habitat was a subject to various impacts over the years and suffers on a decrease in its area, changes in species composition and occurrence of invasive and ruderal species. The most significant threats to the habitat are related to intensive or excessive grazing of livestock, abandonment of grassland management (e.g. cessation of grazing or mowing), afforestation, plowing, conversion into agricultural land, conversion to other land uses (tourism, recreation,

urbanization, construction of infrastructure), construction of energy plants and natural succession. Restoration is the tool used to respond to ecosystem destructive processes. Ecological restoration includes managing and supporting the self-restoration of a degraded, damaged or destroyed ecosystem, it is a means of maintaining and conserving biological diversity. The purpose of the restoration activities in the habitat 62C0 \* Ponto-Sarmatian steppes is to improve the condition of damaged areas, restoration of individual components and restoration of specific structural elements of the habitat, as this goal corresponds to the objectives of the project "Restoration of priority natural habitat 62C0 \* "Ponto-Sarmatian steppes in the region of Kaliakra".

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## **ACCUMULATION OF HEAVY METALS IN ORGANS OF TALL FESCUE (*FESTUCA ARUNDINACEA* SCHREB.)**

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**Key words:** *tall fescue, flotation tailings, heavy metals, fertilization*

### **Abstract**

The tall fescue (*Festuca arundinacea* Schreb.) was sown on the flotation tailings of lead, copper and zinc mine. The aim of the study was to examine the possibility of phytostabilization of this substrate. Experimental field was set up in central Serbia in april 2021. The one half of experiment plots was fertilized with organic and mineral NPK fertilizer, and the other half of plots were control plots without fertilizers. Flotation tailings are characterized by very unfavorable physical and chemical properties such as increased heavy metals content of and very low content of nutrients. The measured content of all heavy metals (Cu, Cd, Ni, Pb, Zn, Fe) in the tailings, except manganese (Mn), was above the maximum allowed quantities for arable land, which led to their increased content in the roots of tall fescue. The heavy metal contents accumulated in roots of tall fescue were in the amounts that

are toxic to most plant species. The most abundantly accumulated element in both roots and shoots was Fe. Fe was accumulated in concentrations of 7742 mg kg<sup>-1</sup> in the roots, and 3594 mg kg<sup>-1</sup> in the leaves of non-fertilized plants, respectively 6361 mg kg<sup>-1</sup> in the roots and 6801 mg kg<sup>-1</sup> in the leaves of fertilized plants. The concentration of heavy metals was higher in roots than in shoots of tall fescue, and the calculated translocation coefficient was less than 1 for all tested heavy metals, except iron in fertilized plants. Compared to the control (non-fertilized), plants treated with NPK adopted more Cu, Cd, Pb, Ni, and less Fe, Zn and Mn. The tall fescue has accumulated most of the adopted heavy metals in the roots, which is why we can classify it as an excluder plant for those elements.

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## THE POSSIBILITY OF DELAYED FRUIT THINNING IN GALA APPLE

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**Key words:** *apple, met amitron, ethephon, yield, fruit quality*

### Abstract

The optimal period of apple fruit thinning is from the fruit set until the moment when diameter of the king fruit is 15 mm. After that period, the application of standard chemical agents for fruit thinning in regular concentrations remains without the effect. The aim of this study was to achieve chemical thinning of apple fruits with larger diameter than the optimum by applying the increased concentrations of met amitron or ethephon compared to those of recommended. The following treatments were applied: 1) met amitron 250 mg/l (MM250), 2) met amitron 250 mg/l + 6-benzyladenine 150 mg/l (MM250+BA150), met amitron 250 mg/l + ethephon 300 mg/l (MM250+E300), 6-benzyladenine 150 mg/l + naphthylacetic acid 15 mg/l+ ethephon 300 mg/l (BA150+NAA15+E300), naphthylacetic acid 15 mg/l + ethephon 300 mg/l (NAA15+E300), ethephon 300 mg/l (E300) and untreated control treatment (UTC). The treatments were applied 28 days after full boom when average diameter of king fruit was 19 mm. The obtained results show that the treatments in which ethephon was combined

simultaneously with 6-benzyladenine and  $\alpha$ -naphthyl acetic acid (E300 + BA150 + NAA15), with  $\alpha$ -naphthyl acetic acid (E300 + NAA15) or only with metatriton (MM250 + E300 ) significantly reduced the number of fruits on the tree compared to the control treatment. Although the yield on the trees of these treatments was slightly lower compared to the control treatment, the differences were not significant because the same treatments had larger fruits, whereby the significantly larger fruit than in the control treatment were determined only in the treatments E300 + BA150 + NAA15 and E300 + NAA15. It was noticed that the fruit firmness had lower values, whereas starch index had higher values in all the treatments with ethephon, while the statistically significant difference compared to the control treatment was found only in the treatment when ethephon was applied alone. There were no significant differences among the applied treatments in terms of soluble solids and total acid content.

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## **INFLUENCE OF AGROECOLOGICAL CONDITIONS ON PINOT NOIR AND PROKUPAC GRAPES AND WINES QUALITY**

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**Key words:** *grapevine, locality, air temperature, quality of grapes and wine*

### **Abstract**

The quality of wine largely depends of grapes composition and quality. Aim of this research was to determine influence of locality agroecological condition on grapes and wine quality of Pinot Noir and Prokupac variety. The experiment was set up on Faculty of Agriculture University of Belgrade experimental field "Radmilovac", which is located in Grocka wine growing area. The experimental vineyard was planted in 2005, with a planting distance between rows of 3 and with 1 m row space. Tested varieties were grafted on Kober 5BB rootstock. The influence of air temperature on grape quality indicators was monitored, from *veraison* to the full maturity. To determine harvest moment samples was harvested on interval of 5 days. In paper were presents results of total acids (g/l), sugar content (%), pH

values in grape juice-must, total phenols (mg GEA/l), and anthocyanins content (mg/g) in berry skin. For wine were present alcohol (vol. %), extract (g/l) and total phenolic content (mg GEA/l), also were present results of color intensity, color nuance and total acids (g/l). According to the obtained results, Pinot Noir variety had better results for total acids (3.23 g/l) and sugar content (22.0%) in grape juice compared to the other tested variety Prokupac (5.85 g /l; 20.3%). The pH value for Prokupac was lower (3.19) compared to Pinot Noir (3.27). The produced wine from Pinot Noir variety had similar results of alcohol content, extract, nuance and color intensity (12.5 vol.%; 22.01 g/l; 0.59; 0.30) as the wine of the Prokupac variety (12.2 vol.%; 21.08 g/l; 0.57; 0.40). A difference was found for total phenolic content in wine for Pinot Noir variety (1450.0 mg GAE/l), compared to the Prokupac wine, which had 1000.0 mg GAE/l. The results of the wine analysis indicate that rose wines were made from examined wine varieties in agroecological conditions of Grocka wine growing region were in category of high quality wines.

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## **RESEARCHES CONCERNING THE CROP TECHNOLOGY OF GHERKINS IN OPEN AIR**

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**Key words:** *cucumber, irrigation, cucumber pests*

### **Abstract**

The present paper presents the results of a research conducted with the gherkin crop grown outdoors. The main problems were pest control, virus spreading, constant irrigation and selling of the production. The cultivated hybrid was of the parthenocarpic type. The plants were sown directly in the field on July the 10<sup>th</sup> and the first harvest was made on August the 20<sup>th</sup>. The plants were tied on ropes supported by rods mounted between two rows. The distance between plants in a row was 40 cm and between rows, of 80 cm. The rate of seeds emerging was 80% and the number of plants that were eliminated because of virus infection during the vegetation was 100. In order to control the trips and the red spider mite there were applied pesticides twice a week, until the middle of September. Plants infected with viruses have been removed almost daily from the crop to prevent their spreading. The

minimum amount of water required was 1 l / plantdripper. The total production was 3,000 kg (about 5 kg / plant).

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## **BALTATA RESERVE (NORTHEAST BULGARIA)- THE NORTHERNMOST PART OF THE EUROPEAN LONGOZ FORESTS**

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**Key words:** *longoz forest, testacean, benthal, phytal, mosses*

### **Abstract**

The Baltata Reserve is a magnificent longoz forest, the northernmost part of the European longoz forests. It is located on the Black Sea coast in Bulgaria, at the mouth of the Batova River.

The diversity of the Baltata is truly unique. - there are over 260 species of plants in the area, 28 of which are protected. Over 180 species of birds, 36 species of mammals, 15 species of amphibians and 16 species of fish live on the territory of the Baltata.

The purpose of the work is to establish the taxonomic diversity and structure of the testacean communities in different biotopes of the Baltata Reserve, which has not been studied so far. As a result of the study, a total of 57 species, varieties and forms from 21 genera and 13 families were identified. Frequency of occurrence and relative abundance of each species and genera have been established.

The share of different species and genera in the formation of communities in the studied biotopes – benthal, phytal and mosses is different.

Only two testate amoebae (or 3.5%) were found in all studied biotopes – *Euglypha rotunda* and *Trinemaenchelys*.

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# UNKNOWN PLANTS - PLANT COMMUNICATION

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**Key words:** *sensuousness, chemical signals, electrical signals*

## **Abstract**

For a long time, plants were perceived as a silent background of noisy and colorful animals. It turns out that this is far from the case. Our goal is to promote this still little known aspect of plant life. In this report, we briefly look at plant sensuousness to various environmental factors: light, heat, moisture, chemical compounds, as well as spatial sensuousness and sensuousness to touch. The presence of sensuousness is related to the need to transmit input information, make a "decision" and plants respond to changes in their environment. The main points of communication in plants are highlighted. It is considered at different levels: cellular, tissue, organism and superorganism. At the superorganismic level, the diversity of relationships and related communication is revealed: between plants of the same species, between plants of different species, between plants and fungi, between plants and animals.

Attention is paid to the mechanisms by which information is transmitted: mainly through chemical signals and through electrical signals. Chemical signals are transmitted by water within the plant body (similar to cable connections in human communications) and by air outside the plant body (similar to WiFi). Electrical signals are characteristic not only of fast-reacting plants (eg carnivorous plants), but also of other plant species, including cultivated plants. It seems incredible, but these are the same principles that convey information to animals and us humans.

The link between communication and growth, development and protection of the plants from the effects of negative environmental factors has been revealed. Special attention is paid to the protection of plants against attacks by pests. Possibilities for self-protection of plants or for attracting other organisms to help them in case of pests attack are indicated.

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## ON-LINE SESSION

### Chairman:

**Junior Lecturer. dr.eng. MIRELA PARASCHIVU, Faculty of Agronomy,  
University of Craiova**

**Dr.eng. ALINA MARILENA PRIOTEASA, Faculty of Agronomy, University of  
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## DOUBLE HAPLOID MAIZE PRODUCTION

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**Key word:** *Haploid, double haploid, in-vivo*

### ABSTRACT

Maize is a plant widely used by humans with its rich content, as well as animal nutrition, and industry. Due to the ever-increasing food supply, it is a final goal to obtain the highest yield from the maize plant, like other plants, in the unit area. For this purpose, maize is a plant whose breeding has been done most intensively since the 1850s. Hybrid maize breeding is based on the establishment of homozygous lines, with traditional breeding methods, selfing is done during the season for 7-8 years. 100% homozygous lines cannot be obtained. Double haploid technology has been developed to shorten this process and to develop completely homozygous lines. In the double haploid technique, 100% homozygous lines are developed in 2 years. DH lines are used in the development of inbred lineages, genomic selection, mapping of quantitative trait loci (QTL), and generation of new genetic variations. Haploid plants are produced in-vitro and in-vivo techniques. However, adequate results cannot be obtained in in-vitro applications due to the genotype effect. Most of the

commercially developed doubled haploid lines are which is obtained by the in-vivo haploid technique. The in-vitro technique, on the other hand, is less effective in developing doubled lines. In the in-vivo haploid technique, lines called inducers are used. Inducer lines are used as dust collectors in the production of paternal haploid plants and as pollinators in the production of maternal haploid plants. A primary donor is crossed with a plant-pollinator inducer line in maternal haploid production. Among the seeds formed, haploid plants are selected. The fastest and simplest method is the selection with the help of the R1-NJ color marker. Seeds with a colorless embryo and a purple endosperm are haploid seeds. The selected seeds are germinated and the chromosome number is doubled with the application of colchicine. 100% homozygous fertile lines are obtained. Haploid seed multiplication is achieved by selfing. However, the haploid rate is not high, it is a technique that needs to be developed.

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## **AN EXAMPLE OF SUSTAINABILITY: VERTICAL FARMING**

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**Key word:**population, vertical agriculture, resources

### **Abstract**

According to the Food and Agriculture Organization of the United Nations (FAO) report, the most pressing problem is the concern of not being able to meet the increasing demand for a safe, adequate and suitable food supply for the growing population. The same report underlines that by maintaining existing farming practices, there will not be enough space to meet the world's growing food needs. For this reason, problems such as climate change and drought and extreme weather events that rapidly increase their effects reveal that agricultural resources should be used more effectively.

Vertical agriculture is an alternative method to the efficient use of resources (for example, 70-80% less water) in order to use the unit area much more efficiently than traditional agriculture. Since the transportation problem is eliminated in vertical farms established in the city, exhaust emissions to nature are also reduced. Weather events that affect crop yield in

traditional agriculture and are not under the control of the producer have been eliminated in vertical farming systems. Based on the type of plant to be grown in the system, production throughout the year can be programmed on the basis of demand and plant growing conditions can be optimized. Efficiency can be maximized by fine-tuning the temperature, humidity and lighting conditions.

This review article draws attention to the fact that all the reasons I mentioned above, lead us to find more innovative and environmentally friendly agricultural techniques and that the studies in this field are gaining momentum.

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## **THE EFFECT OF PRIMING PROCESSING ON THE ROOT AND SEEDLING DEVELOPMENT OF CHICKPEA SEEDS**

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**Key words:** Seed priming, Chickpea, Yield, KNO<sub>3</sub>dose

### **Abstract**

Today, the cultivation area allocated for edible grain legume varieties, which cannot meet expectations due to drought, is decreasing over time. A faster and more efficient development period should be provided in order for the cultivation area of legumes to increase and for legume production to become preferable by the producer. At the same time, with the completion of the production process in a shorter time, both more production diversity will be provided and planting traffic will be minimized. Priming is defined as all controlled processes that are carried out on the seed before planting, initiating the metabolic activity necessary for germination, but not allowing root exit. In order to bring the legume production back to the producer and make it more attractive, to provide rapid production in terms of germination and seedling development, and at the same time to increase the amount of input, pre-treatment (priming) applications will be made to the seeds, which are the production material. Although it varies according to the forms applied as a result of KNO<sub>3</sub> priming processes, germination speed and strength will increase, progress will be made in seedling growth and development, yield increase will be achieved and weed damage will decrease as production time will

decrease.Improvement will be achieved for the manufacturer and will increase the preferability. At the same time, durable plants will be obtained and production will be tried to be completed with minimal problems. In the research conducted for this purpose; When examined statistically in terms of root count, root length, root weight, seedling height and seedling weight characteristics, 1% KNO<sub>3</sub> dose ranked 1st. We recommend that our producers use a 1% dose of KNO<sub>3</sub> as a suitable priming concentrate in chickpea production.

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## **The Effect Of Priming Process On Root And Seedling Development Of Some Food Legumes Seeds**

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**Key Words:** *Priming, edible legumes, lentil, KNO<sub>3</sub>*

### **Abstract:**

Edible legumes, which are from the "*Leguminosae*" family, are one of the plant-based foods that are important in human nutrition. Edible legumes; have superior features such as containing high levels of absolutely essential amino acids (lysine), not containing cholesterol, having low fat ratios, being rich in microelements and vitamins.

Various applications to the seed before sowing in order to minimize the problems that may occur during germination and emergence due to adverse environmental factors or directly to the quality and structure of the seed, to ensure uniform seedling emergence and strong seedling development in a short time, and in order to increase resistance to stress conditions, various applications made to the seed before planting are called "priming" in general. In this research, Native Red Lentil seeds belonging to the "*Lens culinaris*" species were used as plant material. For application priming %1 KNO<sub>3</sub>, %2 KNO<sub>3</sub>, %3 KNO<sub>3</sub> doses were used. And only pure water was used as control. Seeds were kept in KNO<sub>3</sub> doses and pure water for 18 hours at room temperature. At the end of 18 hours, the seeds were planted in viols.

Among priming application; root number, root length, root weight, total leaf weight, stem length, seedling length and seedling weight parameters were measured. Root weight, total leaf weight, stem length, total number of leaves and seedling weight were examined statistically significant examined. We recommend our farmers to use %3 KNO<sub>3</sub> priming dose in their lentil production.

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## **PLANT GROWTH-PROMOTING RHIZOBACTERIA: THEIR POTENTIAL USE IN FIELD CROPS AND IMPORTANCE IN TERMS OF AGRICULTURAL SUSTAINABILITY**

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**Key words:** *plant growth promoting rhizobacteria (PGPR); biofertilizers; biocontrol*

### **Abstract**

The natural balance of the Climate of Earth has deteriorated due to many human-driven factors such as population growth, industrialization, misuse of agricultural lands and the destruction of natural resources, and the possibility of the fear of a global crisis, which has had adverse effects on many fields up to now, especially in agriculture, has become a matter of concern. The climate crisis substantially affects agricultural production and causes major losses in agricultural productivity, since agricultural production is dependent on the direct use of natural resources. Therefore, the possibility of the fear of a global food shortage makes the issue of sustainability in agriculture more important. In order to minimize the use of chemical fertilizers and pesticides for sustainable agriculture, alternative choices that are harmless both to the environment and nature such as rhizobacteria are preferred. These beneficial microorganisms, called plant growth-promoting rhizobacteria, PGPR; in consequence of their use as biofertilizers, it is of prime importance with regards to their contribution to the continuity of agricultural sustainability and lower cost compared to chemical fertilizers. In addition to their plant growth-promoting effects, PGPRs also stand out with their use in biological warfare. In this review, the use of plant growth-promoting bacteria in field crops and their importance for the continuity of agricultural sustainability were examined.

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# POLYPLOIDY BREEDING APPROACHES ABOUT IMPORTANT NATURAL SWEETENER STEVIA

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Key words: *Stevia*, *biotechnological*, *Polyploidy*

## Abstract

Due to the rapidly increasing obesity, diabetes and other diseases around the world, the search for healthy and natural sweeteners is increasing rapidly.

*Stevia* (*Stevia rebaudiana* Bertoni) has the potential to be a significant alternative food sweetener with its diterpene glycosides content, which has a much higher taste than sucrose. However, the breeding and production of *stevia* has quite difficulties due to the perennial nature of the plant, self-incompatibility/ cross pollination structure and low germination potential. It is needed to use traditional breeding methods and biotechnological breeding approaches together for scientific studies on crop improvement and steviol glycosides production in *stevia*.

The main methods used in *stevia* breeding are selection (especially recurrent selection), mutation, synthetic breeding, repetitive selection, and polyploidy breeding. Polyploidy breeding is quite valuable as they have larger leaves and higher steviol glycoside potential than diploids.

This article shows the importance of polyploidy in *stevia* breeding and reviews all significant data accessible in previous scientific studies about *stevia* polyploidy breeding.

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# LIDAR STUDIES AND POTENTIAL APPLICATIONS

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**Key words:** LIDAR, applications, modelling, potential area

## **Abstract**

Laser Imaging Detection and Ranging (LIDAR) is a technology that allows understanding the distance of an object or a surface by using multiple laser beams.

Simple working principle; It is the calculation of the distance by means of the time difference between the time of exit from the source and the return time of the constant speed laser pulse sent to the object or surface to be measured. Lidar measuring system; it can be examined in three basic groups as airborne, terrestrial and mobile. When the Lidar scan data is combined, the resulting vector data is converted into a 3D point cloud using various programs. With this point cloud, which is created depending on the object properties to be calculated, sections are created at certain intervals over the land. With the use of Lidar, it is planned to reduce the loss of workforce in the field and loss of time in the office to very low levels. In this study, the Lidar system is explained and in which areas it can be used in engineering measurements and its potential advantages are discussed.

The name of the data that LIDAR obtains from these measurements is "numerical height information". The measurement does not calculate the position of the object, but only the altitude, that is, the "z" value (height above sea level). In order to detect other coordinates, the Global Positioning System (GPS) is used together with LIDAR, so that "x" and "y" coordinate information and "z" values are obtained. Lidar technology is becoming more and more common. It is expected that its use in the sectors (construction, agriculture, forestry, mining, etc.) will become more widespread and its capabilities will increase in the future



# EVALUATION OF SOIL TILLAGE SYSTEMS ON THE SCALE OF TURKEY

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**Key words:** *conventional tillage, no-till, conservation tillage, soil properties*

## **Abstract**

The aim of this review article is to provide readers with the results of previous studies on protective tillage systems, and to make suggestions to the readers about the effects of direct cultivation on the properties of the soil, its advantages and disadvantages, at the scale of Turkey. It is estimated that the world population will reach 9.8 billion by 2050 and it is of great importance to manage the existing arable land in a sustainable way to meet the food demand of this increasing population. According to FAO, 1/3 of the world's agricultural land has become unproductive due to mismanagement. Studies have shown that there is an average of 150 tons/ha of soil loss per year in the world. In addition, the effect of increasing climate change in recent years has made the increase in soil degradation more severe in the arid and semi-arid regions of the world. In order to reduce this violence and improve the health of the soil, protective tillage, especially zero tillage (ZT), which is an alternative to traditional tillage, is rapidly becoming widespread. As a result, it has been concluded that the application area of ZT is quite limited in Turkey. For this reason, more research should be done to remove the obstacles in front of ZT, farmers should be included in pilot studies and awareness should be raised. In this way, direct sowing can be applied in larger areas.

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# CURRENT APPROACHES IN ECOSYSTEM MODELING

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**Key words:** *Ecosystem, Ecology, Modelling, Machine Learning*

## **Abstract**

Ecosystem management is a complex management system that includes interacting organisms, processes and scientific disciplines. As single-species focused management systems have not been able to provide a through solution to applied ecology, ecosystem-based management systems have become the main focus in this area. Ecosystem-based management involves various actions to provide an understating of the ecosystem components, dependencies, interactions and feedback of the components. Along with building an ecosystem model, various software tools and websites are used to visualize and paint the desired picture of the ecosystem models to provide better understanding and point the missing components. Recently, machine learning models and algorithms are used to identify the solutions and provide overview for future scenarios in ecosystem modeling. This study provides an overview of potential ecosystem models and their use in ecosystems with simple examples. In addition, the main modeling tools used for various purposes in forest and marine ecosystems are expressed in this study. Tools to be explained mainly focus on commonly used and relatively new forestry modeling tools. Specifically, we provide an insight to terrain and vegetation modeling tools and their capacity. Managing an ecosystem is a challenging process as there is a limited data and balancing ecosystem components might not meet the model goals. In this case, modeling involves certain uncertainties. This study provides main types of uncertainties and certain strategies to address these challenges. This study also provides an overview of applications in ecosystem services, commonly used machine learning model groups in ecosystem services and the certain mistakes to avoid when creating a machine learning model.

# HEALTH EFFECT OF PLANT BASED BIOACTIVE COMPOUNDS

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**Key words:** *phytochemicals, phenolics, antioxidants, fruit, vegetables.*

## **Abstract**

Phytochemicals naturally occurring in plants and biologically active are chemical compounds. In addition to serving as a natural defense system in plants. They are also responsible for color, aroma and taste. Food provides essential nutrients for life and phytochemicals necessary for our bodies to promote health and prevent disease. Cardiovascular disease, cancer and obesity are ranked as the first and second leading causes of death in world. Regular consumption of fruit and vegetables reduces the risk of most diseases. Functional foods that contain significant amounts of bioactive components may provide desirable health benefits beyond basic nutrition. It is estimated that more than 5000 phytochemicals have been identified, but a large percentage still remain unknown. However, more and more convincing evidence suggests that the benefits of phytochemicals in fruit and vegetables may be even greater than is currently understood because oxidative stress induced by free radicals is involved in the etiology of a wide range of chronic diseases.