

Abstracts

of the papers of **Chief Assis. Dr. Zhelyu Avramov**

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B3.1 Habilitation work – monograph

Viral, phytoplasma and bacterial vine diseases.

InfoVision Publishing House, ISBN 978-619-7737-10-3. Reviewers: Assoc. Dr. Slavcho Slavov, Assoc. Dr. Violeta Kondakova, page 256, (Bg).

Zhelyu Avramov, 2023.

Abstract

Viral, phytoplasma and bacterial infections occur in all wine-growing regions of the world, and Bulgaria is no exception in this respect. This fact is associated with continuous scientific interest and ongoing research in various aspects, one of which is the methodology of their identification. The emergence of ELISA and PCR methods after the 1980s accelerated the establishment of pathogens and their more accurate taxonomic affiliation, as well as restructured the classification of viruses, phytoplasmas and bacteria on vines (and not only). Their application was accompanied by the discovery of unreported vectors. Continuous improvement of serological and molecular methods enabled effective counteraction against vectors and pathogens thus reducing economic loss from them.

The study of viral, bacterial and fungal infections in grapevines has traditions, as well as achievements in their detection and epidemiological description. In the last three decades, phytoplasma diseases have been intensively studied not only in vineyards, but also in other agricultural crops, as well as their natural vectors. As a result of a large number of analyses and period of observation (2005 to 2023), the presence of virus, bacterial and phytoplasma infections in Bulgaria was proved. Transmission of phytoplasmas by previously reported vectors was confirmed, as well as new vectors were found. The discovery that donor ↔ recipient transfer was possible reduced the risk of infected planting material and prevented economic losses not only from phytoplasmas but also from viruses and bacteria. The established sensitivity of individual wine and dessert vine varieties to viral, phytoplasma and bacterial pathogens is to a different extent to each of these, as well in terms of spatio-temporal aspect. The conducted studies did not confirm the spread of quarantine diseases with viral, phytoplasma, and bacterial pathogens.

The results obtained from previous studies suggest the possibility of creating a taxonomic characterization of pathogens found and distributed in the country.

Key words: Viral, phytoplasma and bacterial infections, vectors, grapevine, varietal sensitivity, distribution by area, Bulgaria.

G7. 1

Acta Entomologica Bulgarica, 3/4, p. 22-29, ISSN 1310-5914.

CUCUMIS SATIVA - NEW NATURAL HOST PLANT FOR TOMATO SPOTTED WILT VIRUS (TSWV) IN BULGARIA.

Olya Karadjova, Zhelyu Avramov, Vladimir Krumov, 2003.

Abstract

Tomato Spotted Wilt Virus (TSWV), the type species of *Tospovirus* genus, causes considerable economic losses of agricultural and ornamental crops throughout the world (Goldbach, Peters, 1994) and infects at least 900 plant species, with the number of natural host species record steadily increasing (Peters, 1998). *Tospoviruses* are transmitted by thrips (Thysanoptera: Thripidae) in a persistent manner (Sakimura, 1962, 1963). TSWV was first reported in Bulgaria in 1952 (Kovatchevsky, 1952) and *Thrips tabaci* Lind. was proved as the only vector of the virus (Ivancheva-Gabrovska, 1954). For many years tobacco has been the most seriously affected crop by TSWV (Ivancheva-Gabrovska, 1984; Dimitrov, 1991; Hristova et al., 2001); some outbreaks on outdoor tomato have been also observed. After the introduction and spreading of *Frankliniella occidentalis* Perg. in Bulgaria destructive outbreaks of TSWV have also occurred in some greenhouse crops - tomato, pepper and ornamentals (Trenchev, 1991; Trenchev, Karadjova, 1992; Hristova et al., 2001). Although cucumber has been reported as host plant of TSWV in many countries in Europe and America (Duffus, 1971; Bautiste et al., 1995; De Avilla et al., 1993; Wijkamp, 1995) there are no records of natural infection of this host in Bulgaria. *Cucumis sativus* L. is reported as a natural TSWV host plant for first time in Bulgaria. The virus was confirmed by ELISA and petunia leaf discs assay. Mechanically inoculation indicator plants do not develop TSWV symptoms. The virus titer of infected cucumber seedlings was relatively high and the average ELISA values were comparable to those found for the positive control. The virus concentration of both tested sections of mature cucumber plants varied considerably. The ELISA readings of the upper stages of cucumber plant were comparable to those of the healthy plants while the lower sections showed high values. Thus the virus concentration grows weaker as the plant grows bigger. *F. occidentalis* is the only vector of TSWV on *Cucumis sativus* L. in Vrana greenhouse. The correlation between the percentage of males and the transmission efficiency of *F. occidentalis* population was established.

Key words: TSWV on cucumbers, vectors, Bulgaria

G7. 2

Bulletin of Insectology 64 (Supplement), 2011, 71-72.

FIRST REPORT OF STOLBUR PHYTOPLASMAS IN PRUNUS AVIUM IN BULGARIA.

Avramov Z., Contaldo N., Bertaccini A., Sakalieva. D., 2011.

Abstract

Since 2005 the National Plant Protection Service in Bulgaria has included a monitoring program for detection, among other quarantine pests and pathogens, of quarantine phytoplasmas. During surveys conducted under this program. symptoms similar to those reported for phytoplasma diseases were

observed in cherry trees. Sampling and molecular analyses allow to verify presence of stolbur phytoplasmas in symptomatic plants of cherry and bindweed in the same orchards suggesting the association of the disease in cherry with phytoplasmas.

Key words: phytoplasmas, nested PCR, stolbur, molecular identification

G7. 3

Bulletin of Insectology 64 (Supplement), 2011, 281-284.

EUROPEAN INTERLABORATORY COMPARISON AND VALIDATION OF DETECTION METHODS FOR ‘*CANDIDATUS PHYTOPLASMA MALI*’, ‘*CANDIDATUS PHYTOPLASMA PRUNORUM*’ AND ‘*CANDIDATUS PHYTOPLASMA PYRI*’: PRELIMINARY RESULTS

THE EUPHRESCO FRUITPHYTOINTERLAB GROUP, 2011. (Helga Reisenzein, Stephen Steyer, Kris de Jonghe, Zhelju Avramov, Santiago Schaerer, Gabriela Schlesingerova, Hana Orsagova, Bernd Schneider, Mogens Nicolaisen, Ester Torres, Joan Bech, Assumpcio Batlle, Amparo Laviña, Isabel Font, Graziella Pasquini, Luca Ferretti, Marica Calvi, Samanta Paltrinieri, Assunta Bertaccini, Dag-Ragnar Blystad, Sonja Sletner Klemsdal, Linda Kox, Jeanette Teunisse, Bart van de Vossenbergh, Ewa Hennig, Justyna Moszczynska, Esmeraldina Nascimento, Agostinho de Sousa, Eugenia Andrade, Lubomir Horvath, Michaela Hudecoba, Marina Dermastia, Natasa Mehle, Nursen Ustun, Aydan Kaya, Adrian Fox, Anna Skelton).

Abstract

A working group was established in the frame of EUPHRESCO Phytosanitary ERA-NET Project aimed to compare and validate diagnostic protocols for the detection of ‘*Candidatus Phytoplasma prunorum*’, ‘*Ca. P. mali*’ and ‘*Ca. P. pyri*’ in fruit trees. Four molecular protocols were submitted to interlaboratory trials starting from extracted DNAs prepared in four laboratories. The tested molecular protocols consisted in universal and group-specific real time and conventional nested PCR assays. A good agreement among laboratories was obtained and high values of diagnostic sensitivity were revealed for all tested protocols. The preliminary analysis of the results also highlighted some diagnostic specificity problems that require further investigations

Key words: ringtest, ‘*Candidatus Phytoplasma prunorum*’, ‘*Ca. P. mali*’, ‘*Ca. P. pyri*’

G7. 4

Bulgarian Journal of Crop Science, 2017, 54(2), 10-23.

SOILBORNE FUNGAL PATHOGENS OF SMALL GRAIN CEREAL CROPS IN BULGARIA: SPECIES COMPOSITION AND DISTRIBUTION

Ivo Yanashkov, Zhelyu Avramov, Tzenko Vatchev, 2017.

Abstract

Small grain cereal crops including wheat, barley, rye, oats, triticale, einkorn etc. are subject to attacks of various soil inhabiting plant pathogenic fungi and fungus-like organisms. All growth stages of cereal crops are susceptible to infections. Attacks lead to pre-emergence decay of seeds, post-emergence damping-off of cereal seedlings, root and lower stem rot in later growth stages of the infected cereals. In individual cases, infection proceeds without obvious symptoms until favorable conditions arise or disease remains latent to the end of growing season and harvesting. Results of the present study show that fungi of genus

Fusarium are the most frequent soilborne pathogens isolated from cereal crops in the country. Predominating species include *F. oxysporum*, *F. graminearum* and *F. culmorum*, constituting respectively 32%, 22% and 12% of the total number of pathogenic isolates obtained from the roots and lower stems of cereal plants. Other *Fusarium* species, such as *F. sporotrichiella* and *F. equiseti*, occur sporadically in a few fields grown with cereals. Other soil inhabiting pathogens, associated with root rot and stem base necrotic lesions on cereal crops are *Drechslera sorokiniana* and *Rhizoctonia solani*, constituting respectively 11% and 8% of the total number of isolated fungi. Fungus-like isolates of genus *Pythium*, *P. ultimum* in particular, and some currently unidentified *Pythium* spp., represent 10% of isolated fungi. The representatives of this genus are among the most prevalent pathogens, attacking root system of cereal plants, cultivated in waterlogged and cool soils. These species can infect cereal plants either individually or in combinations of two and more pathogens. Mixed infections with *Fusarium* spp., *Pythium* spp. and *Rhizoctonia solani* occur in some of the surveyed cereal fields in the country. Economic losses caused by soilborne diseases of cereal crops in various grain-producing areas vary over the years and depend on the host species, soil, climatic, and agronomical conditions of growing.

Key words: pathogenic soil inhabiting fungi; small grain cereal crops; community structure; distribution

G7. 5

Journal of Mountain Agriculture on the Balkans (JMAB) ®, 2018, 21(2), 152-160.

MONITORING OF PHYTOPLASMA INFECTIONS IN THE ORCHARD PLANTATIONS OF BULGARIA IN THE PERIOD 2012-2017

Dora Panajotova, Zhelyu Avramov, Mariana Laginova, 2018.

Abstract

In the period 2012-2017 new orchard plantations of European and traditional Bulgarian varieties were planted on an area of 1470 ha. To prevent a possible spread of quarantine and economically significant diseases, the Bulgarian Food Safety Agency launched a monitoring programme for quarantine pests on fruit trees, including phytoplasma infections. Throughout the years 330 orchard plantations, of which stone fruit varieties – 235 on an area of 1400 ha, pome orchards – 84 on an area of about 350 ha, 5 walnut plantations – 9.15 ha, 4 mixed orchards – 6.52 ha and 2 plantations of dog rose – 64.4 ha were controlled. The circulation and import of orchard planting material was constantly monitored and all nurseries in Bulgaria were controlled. 2726 plant samples (from Border Inspection Points and 20 Regional Directorates) and 54 numbers of insect vectors (*Cacopsylla pyri*, *Psylla pyri*, etc.) were performed in Central Laboratory for Plant Quarantine for phytoplasma analysis. Total DNA was extracted from plant tissue or a preliminarily determined specimen in CTAB buffer. The laboratory analysis was performed by Nested PCR with two universal primer pairs (P1P7/U3U5) and specific ones (f01/r01) with following RFLP analysis for final identification and species affiliation. The results confirm the spread of the following infection: Apple Proliferation, Pear decline, European Stone Fruit Yellows phytoplasmas, which were found in new regions, as well as an extended range of spreading of their vectors in Northern Bulgaria (Targovishte, Vidin, Shumen). The regions where infections were found and measures taken to isolate and destroy the agents, such as Kyustendil, Plovdiv, Sliven, Burgas, Ruse, remain potentially dangerous in terms of disease spreading. This is the result of the non-compliance with the instructions of the phytosanitary inspectors to destroy the infected trees and ban the collection of cuttings, as well as of the lack of preventive measures such as equipment disinfection, vector control, etc.

Key words: phytoplasma pathogens, fruit threes, Bulgaria

G7. 6

Journal of Mountain Agriculture on the Balkans (JMAB) ®, 2018, 21(3), 299-311.

EFFECT OF ABIOTIC STRESS FACTORS ON THE PRESENCE OF PATHOGENS IN LETTUCE (*LACTUCA SATIVA L.*) VAR. ROMANA AND VAR. CAPITATA PLANTED IN POLYETHYLENE MULCH

Zhelyu Avramov, Petya Barisova, Boryana Ivanova, Svetoslav Anev, Milan Rizakov, Milena Yordanova, Nidal Shaban, 2018.

Abstract

The aim of the study was to identify the abiotic factors that influence the onset of diseases in a salad (*Lactuca sativa L.*) var. romana and var. capitata, grown under polyethylene film in Sofia field. Based on the objective, we set plots experienced in duplicate salads with foil, and two plots without foil. In order to obtain comparable results, we carried out soil sampling in advance to check the availability of nitrogen, phosphorus and potassium. The first inspection was conducted in February 2017 with an analysis of the presence of soil pathogens in the experimental plots. So far, we have identified soil fungi of the genus *Alternaria*, *Fusarium*, *Rhizoctonia*, *Botrytis*, *Aspergillus*, *Penicillium* and *Mucor*. The second inspection will be conducted before the active growing season, with a sampling of plants with disease symptoms and comparison of the microbiological parameters after the end of the salad growing season. Currently the results show a significantly better development of plants grown under the plastic film without the occurrence of pathogens threatening collapse of salad plants. After the final results, we sincerely hope to recommend to salad producers to implement the use of foil against the collapse of lettuce under the influence of low temperatures and pathogens.

Key words: Stress, abiotic factors, soil pathogens on lettuce, mulch, Project 17/2016 FU

G7. 7

Journal of Mountain Agriculture on the Balkans (JMAB) ®, 21(3), 184 - 206.

SPECIES COMPOSITION OF PATHOGENS OF MEDICINAL AND AROMATIC PLANTS RECORDED IN BULGARIA

Marin Hristov, Kristina Nikolova, Milen Venelinov, Zhelyu Avramov, 2018.

Abstract

Bulgaria is rich in medicinal plants. They have been used since antiquity to obtain valuable medicines, spices, aromatic and other substances. The modern chemical and pharmaceutical industry uses plants to produce medicinal products such as nivalin, morphine, glaucine, vincapan, rutin, esculin, xanthorin, scopolamine, etc. The emergence and spread of diseases affect the production quality and quantity. The use of plant protection products is undesirable. The good plant protection practices include being familiar with pathogens, plant damages and inventory of the information available in the country on these issues, which was the aim of the study funded by the Research Sector at the University of Forestry under Project 21-2016. All issues of five prestigious scientific journals, namely “Bulgarian Journal of Crop Science“; “Agricultural Sciences Journal“; “Gradinarstvo“; “Agricultural Science and Technology” and “Bulgarian

Journal of Agriculture” of the period 1973-2017, were reviewed. The publications within this period are over 3800. Only 49 issues contain information related to medical and aromatic plant pathogens. Eleven published books were found among the specialized Bulgarian literature of the period from 1962 to 2017. Four of them consider diseases and pests of essential oil and medicinal crops, and the other 7 refer to the cultivation technology. Eight manuals and two textbooks were issued, which consider crop diseases and contain information about a limited number of crops – oil rose (*Rosa damascena*), mint (*Mentha* sp.), lavender (*Lavandula vera*), coriander (*Coriandrum sativum*), sage (*Salvia officinalis*), valerian (*Valeriana officinalis*), marshmallow (*Althaea officinalis*), lemon balm (*Melissa officinalis*), Cumin (*Carum carvi* L.) and fennel (*Foeniculum vulgare* Mill.). The described diseases of essential oil and medicinal crops are caused by various pathogens (viruses, bacteria, phytoplasmas), but the fungi are the most common and frequently reported. The results of the study show that the pathogens of these crops are still not well researched.

Key words: pathogens, medicinal, aromatic plants, source literature, Project 21/2016 UF, Bulgaria

G7.8

Journal of Mountain Agriculture on the Balkans (JMAB) ®, 2018, 21(3), 289 - 298.

INFLUENCE OF ABIOTIC STRESS FACTORS IN THE OCCURRENCE OF FUNGAL PATHOGENS ON LETTUCE (*LACTUCA SATIVA* L.) VAR. ROMANA AND VAR. CAPITATA IN SOFIA VALLEY

Zhelyu Avramov, Paola Dimitrova, Boryana Taseva, Milena Yordanova, Milena Radeva, Nidal Shaban, 2018.

Abstract

The lettuce (*Lactuca sativa* L.) is one of the oldest vegetable crops. Due to its valuable nutritional, dietetic and healing properties, it was grown in the Middle Ages. Salad as a vegetable culture is found in almost all countries. The largest areas occupy in Europe, North America and New Zealand and attacked by a large number of phytopathogens causing economically significant diseases and their degree of manifestation and assault are greatly influenced by climatic growing conditions. The aim of the current study was to detect diseases in lettuce induced by abiotic stress factors. Studies were conducted on 19 lettuce varieties in the Educational experimental field of the University of Forestry, located in the region of Sofia field. The plants were planted at three different conditions with three repetitions without treatments (three types of greenhouses – two unheated greenhouses and low tunnel covered with a polymer foil). The observations were conducted in the fall of 2015 and twice at the beginning and at the end of spring 2016 and funded under Project 17/2016 of the Forestry University. All plants with symptoms of the disease were examined in the laboratory and the losses were reported statistically. Samples of plants with suspected viral infection were subjected to a serological analysis and fungal pathogens were isolated on nutrient media and a morphology (microscopic) identification was carried. Up to date, the results of the studies indicate *that the viral infection has not been established yet. The fungal pathogens as Verticillium, Botritis and Septoria spp., causing plant diseases were established and identified.* The largest attack and manifestation of gray mould was found in three varieties Fuzila, Funfix and Sumetie and the degree of losses reached more than 90%. Explaining the impact of stress factors will improve the quality and quantity of crops grown from different varieties in the particular climate area.

Key words: stress factors, lettuce diseases, Project 17/2016 FU, Sofia valley

G7. 9

Bulgarian Journal of Agricultural Science, 2019, 25(6), 1175–1190.

SPREADING OF DISEASES CAUSED BY PHYTOPLASMA ON LOCAL AND FOREIGN GRAPE VARIETIES GROWN IN BULGARIA FROM 2005 TO 2018

Zhelyu Avramov, Marco Mihaylov, 2019.

Abstract

Viticulture and winemaking existed from time immemorial. This is determined by the favourable soil and climate conditions in this country. In an effort to promote the development of an ever-growing winegrowing sector and to avoid new quarantines and the spread of economically-relevant diseases caused by phytoplasma, the Bulgarian Food Safety Agency (BFSA) has developed a monitoring programme. The purpose of the study is to look into the spread of grape vine diseases caused by phytoplasma and then, on the one hand, to establish the specific non-autochthonous and autochthonous grape varieties prone to grapevine yellows and, on the other hand, to compare data on infections affecting wine, rootstock and dessert grapes used in Bulgaria. Between 2005 and 2018, the study involved over 89 grape varieties of all grape growing regions and over 7 lines of root stock material in Bulgaria. The tests were carried out in the Central Laboratory of Plant Quarantine (CLPQ) and 5519 plant samples of indigenous and foreign varieties in total were analysed for the entire period. Despite the tremendous efforts of the BFSA, the PCR tests only found Bois noir infections to different varieties. In total, there were 258 infected samples out of 37 varieties. Chardonnay, Merlot, Cabernet Sauvignon, Pinot Noir and Alicante Bouchet were found to be the most susceptible ones. The study found 25 infected samples out of 15 Bulgarian local varieties which is a considerably low percentage of infection. The findings are a good basis and will contribute to finding solutions in the selection of grape varieties and improving the health of new vineyards in Bulgaria.

Keywords: Bois noir, ‘Ca. Phytoplasma solani’, grapevine, susceptible cultivars, Bulgaria.

G7. 10

Scientific Papers. Series B, Horticulture, 2019, Vol. LXIII, Vol. 1, 433–438.

COMPARATIVE TESTING OF DIFFERENT LETTUCE CULTIVARS FOR FIELD SPRING PRODUCTION WITH NOVEMBER TRANSPLANTING UNDER NON-WOVEN FABRIC

Milena Yordanova, Zhelyu Avramov, Nidal Shaban, 2019.

Abstract

The aim of this study was to test some cultivars of lettuce for field spring production with November transplanting under non-woven fabric (fleece). The experiment was carried out in the period 2015-2016 in the experimental field on University of Forestry Sofia (42° 7' N, 23° 43' E). There were selected 12 cultivars (10 Batavia and 2 Lollo types) with different requirements for the terms and conditions of cultivation. In the second ten days of November the seedlings were planted in the open field, on the block method with four replications. Immediately after the planting, a low tunnel was placed over the bed, covered with non-woven fabric. During the harvesting of production (April) were made biometric measurements (diameter and average weight per plant). At the end was also reported the percentage of dead plants. Six cultivars from Batavia type were highlighted for winter cultivation under non-woven fabric. Regardless of recommendations given for each cultivar it needs they to be screened for each region, microclimate and growing period.

Key words: Batavia type, *Lactuca sativa*, non-woven fabric, November transplanting

G7.11

Journal of Mountain Agriculture on the Balkans (JMAB) ®, 2020, 23(6), 266-291.

IMPACT OF WILDLIFE REPELLENTS USED ON CORN AND POTATOES GROWN NEAR FORESTS

Zhelyu Avramov, 2020.

Abstract

The everyday activities of useful game cause significant damage to the environment they inhabit. Especially relevant to agriculture is the damage caused by useful game on orchards, vegetable patches and vineyards, as well as corn, potato and cereal fields. The damage caused by useful game to forests and crops bordering woodland is currently a common problem for forest managers and farmers. They are found in all forest ranges, agricultural holdings and hunting reserves where game live. The most damage on agriculture is inflicted by the everyday activities of wild boars, rabbits and, to a lesser extent, deer and roes and other forest animals such as badgers and birds such as jackdaws, common wood pigeons and jays. This study looks at the use of the Porocol game repellent on corn and potatoes grown in places close to forests in two consecutive years. The results are optimistic, especially in the second year, after the first-year experiments were analysed and optimised. It has been shown that the repellent has a pungent, lasting odour, is not affected by weather, does not harm humans and other farm animals, and is easy to apply. Based on the results obtained in the two-year study and its conclusions, it is recommended to use the Porocol repellent in the organisation and implementation of crop protection measures, specifically in the production of corn and potatoes in Bulgaria's semi-mountainous and mountainous areas.

Key words: repellents, Porocol, wildlife, use in corn and potatoes

G7. 12

Bulgarian Journal of Crop Science, 2022, 59(1), 25-37.

STUDY OF SUDDEN DECLINE OF LAVENDER IN BULGARIA CAUSED BY 'CANDIDATUS PHYTOPLASMA SOLANI'

Zhelyu Avramov, 2022.

Abstract

The beneficial properties of medicinal and essential oil crops and medicinal and aromatic plants have been studied for thousands of years. Their cultivation corresponds to their growing demand, which leads to an annual increase in areas and an increase in the amount of herbal collection. In Bulgaria, the cultivation of some crops such as oil-bearing rose, lavender, and mint, has old traditions and world recognition and fame. Lavender as an intensive crop is often accompanied by the appearance of diseases and pests that can cause serious damage and in some cases even compromise the harvest. It is inadmissible in the production and its derivatives, the presence of even traces of the use of plant protection products. On the basis for the improvement of the applied methods of plant protection is an achievement of a good knowledge of the diseases in lavender plantations. An important point is the accurate, fast and reliable identification of pathogens in laboratory conditions of new and unknown phytoplasma diseases for Bulgaria. Examination of the lavender fields revealed symptoms of lavender disease with marked yellowing, reduction, straightening or sagging of the leaves, reduction and abortion of the inflorescences.

A laboratory analysis total number on 91 lavender plant samples, 32 cicadas and 16 weed samples were performed. Phytoplasma infection in five samples from the Chirpan and Dobrich regions belonging to the Stolbur phytoplasma group, showing identical profiles was identified by PCR and RFLP analysis. For confirmation qPCR and sequencing was performed. The results are evidence that the established infection is of Sudden wilting of lavender caused by the phytoplasma 'Candidatus Phytoplasma solani' identified for the first time in Bulgaria.

Key words: Lavender, 'Candidatus Phytoplasma solani', Bulgaria

G7. 13

Scientific Papers-Series B-Horticulture, 2022, Vol. 66(1), 539-599.

COMPARATIVE STUDY OF DIFFERENT CULTIVARS OF LETTUCES IN UNHEATED POLYETHYLENE GREENHOUSE DURING WINTER-SPRING PERIOD

Milena Yordanova, Zhelyu Avramov, Nidal Shaban, 2022.

Abstract

The aim of our study was to test some varieties of lettuce in unheated greenhouse (high tunnel) for the winter growing with November transplanting. The experiment was carried out in the period 2015-2016 in the experimental field on University of Forestry - Sofia (42° 7' N, 23° 43' E). Were selected 19 cultivars (16 Batavia and 3 Lollo types) with different requirements for the terms and conditions of cultivation. The seedlings were planted on the block method with four replications in the second ten days of November in polyethylene greenhouse. Until the time of harvesting, four surveys have been made on the percentage of rooted and dead plants. During the harvesting of production (second ten days of March - early April) were made biometric measurements (diameter and average weight per plant). Several cultivars for winter indoor cultivation were highlighted: 6 from Batavia, all of Lollo, and two from Batavia for outdoor. Regardless of recommendations given for each cultivar it needs they to be screened for each region, microclimate and growing period.

Key words: Batavia type, *Lactuca sativa*, Lollo type, High tunnel, November transplanting

G7. 14

Scientific Papers. Series B, Horticulture, Vol. LXVII, No. 1, 23-28.

CANES WILTING WITH COLLAR AND ROOT ROT OF RASPBERRY CAUSED BY *PHYTOPHTHORA PSEUDOCRYPTOGEA* IN BULGARIA

Zhelyu Avramov, Aneta Lyubenova, , Kaloyan Kostov, Lilyana Koleva, Slavtcho Slavov, 2023.

Abstract

A wide range of herbaceous and woody plant species are known as host plants of *Phytophthora pseudocryptogea*, a relatively newly described species. Recently *P. pseudocryptogea* was isolated from raspberry plants in Bulgaria. Diseases plants were found in the 4 to 5 years old variety Ljulin plants on the biological production orchards in Kostenets region. Canes suddenly wilt and turn brown at the onset of warm temperatures. The plants manifested disease symptoms such as collar and root rot. The precise species determination of obtained isolate was done on the basis of the colony and asexual spores morphology and sequence analyses of the ITS region of the nuclear DNA. The pathogenicity of the fungus was tested by detached leaf bioassay on several raspberry cultivars in the laboratory.

Key words: raspberry, collar and root rot, *Phytophthora pseudocryptogea*, Bulgaria

G7. 15

Bulgarian Journal of Crop Science, 2004, 41, 163-167.

DIAGNOSTICS OF VIRUSES BELONGING TO TOBAMOVIRUSES GENUS IN THE SEEDS: GREEN MOTTLE MOSAIC VIRUS

D. Hristova, G. Avramov, 2004.

Abstract

Cucumber green mottle mosaic virus - CGMMV takes a third place by importance among the representatives of Tobamoviruses genus. It is strictly specialized to the Cucurbitaceae family species. As a representative of Tospoviruses it is transmitted by cucumber seeds. In order to limit the CGMMV infection it is necessary to use virus-free seeds. Such virus-free planting material may be provided through preliminary testing of the seeds. Mass screening of seed material requires the application of modern, rapid and safe methods for detection of viral infection. DAS-ELISA and an electronmicroscopic method for diagnostics of CGMMV in cucumber seeds have been adapted for the purpose. Due to its low sensitivity the indicator test may be used in combination with the other two methods. The contemporary methods for CGMMV diagnosis presented in this paper provide a possibility for mass screening of the planting material and for use of only those batches of seeds that have been proved virus-free.

Key words: seed transmitted, diagnostic, virus, cucumber green mottle mosaic

G7. 16

Bulgarian Journal of Crop Science, 2023, 60(5), 47-55.

STUDY OF THE EARLIEST SYMPTOMS OF PLUM POX IN THE SOFIA VALLEY AND VRATSA, REGION.

Zhelyu Avramov, 2023.

Abstract

Since ancient times, the fruits of the plum have occupied an important place on the table of the Bulgarians. To obtain high and stable yields an important condition is the proper organization and conduct of plant protection activities and the fast, the correct and accurate diagnosis of PPV - Stoneware. In our climate, Plum pattern manifests symptoms first on the first spring leaves. The described symptoms of flowers in different stone species are few and scarce, so we conducted the present study in two following years 2019 and 2020 to describe, differentiate and compare visual symptoms of flowering with the results of DAS-ELISA tests on the leaves of the studied stone species. From the surveyed PPV host species in two orchards 12 mature trees with color symptoms were selected and described in two regions of Bulgaria - the Sofia field (Vrajdebna (1,2 ha) and the Vratsa region (Roman Orchard Nursery (0,4 ha). In a total of 9 samples, PPV infection was confirmed. The established deviations were found only in fruit crops that bloom with white flowers. Based on the results and conclusions, the present study will contribute to the timely detection of the causative agent of pox virus in the earliest symptoms in nurseries and gardens and will provide the right and quick direction to overcome the damage through proper plant protection activities.

Key words: PPV; earliest symptoms; early diagnostics; blooms; Bulgaria

G7. 17

Scientific Papers. Series B, Horticulture, Vol. LXVII, No. 1, 519-524.

STUDY OF DISTRIBUTION OF TOMATO BROWN RUGOSE FRUIT VIRUS (TOBRFV) IN SOUTHERN BULGARIA

Zhelyu Avramov, 2023.

Abstract

The aim of the study is to analyze and investigate viral pathogens on tomatoes and peppers to detect Tomato Brown Rugose Fruit Virus (ToBRFV) in seeds and plant samples. The only hosts of Tomato brown rugose fruit virus are tomato (*Solanum lycopersicum* L.) and pepper (*Capsicum annuum* L.). The spread of ToBRFV carries major risks in tomato and pepper cultivation which are important crops grown in Europe. The symptoms resemble those of other viral infections, such as Tomato Mosaic virus, Pepino Mosaic virus and others found in Bulgaria. To achieve the aim of the study and establish ToBRFV over the two-year period, laboratory analyses were performed on more than 28 seed samples of tomatoes and peppers, imported or in movement within the EC. About 47 plant samples from greenhouses, with the origin of the plants from other countries, were also analyzed. Samples were tested using the ELISA method for five viruses. As a result of this mass screening, the ToBRFV virus was detected on tomato seeds in Bulgaria for the first time. On the recommendation by the phytosanitary authorities, the infected seeds and the tomato plants produced from them were destroyed in order to prevent and limit the future spread of Tomato Brown Rugose Fruit Virus on the territory of Bulgaria.

Key words: ToBRFV, ELISA method, spread, destruction, Bulgaria.

G7. 18

Scientific Papers. Series B, Horticulture, Vol. LXVII, No. 1, 630-637.

IDENTIFICATION OF ALTERNATIVE MEASURES FOR THE MANAGEMENT OF ROOT-KNOT NEMATODES ON SOLANACEOUS VEGETABLES CROPS IN SOUTHWEST BULGARIA

Lilyana Koleva, Georgi Dimitrov, Zhelyu Avramov, 2023.

Abstract

Vegetables from the Solanaceae family (eggplant, tomato, and potato) are among the crops in Europe which in terms of production rank first, and in Bulgaria their production is concentrated in the southwestern part. The aim of the study was to identify alternative root-knot nematode control measures applicable in integrated pest management to improve plant health and reduce dependence on chemical pesticides in Solanaceae vegetable production. Based on the data of new research, a summary list of specific combinations of vegetable crops/species of root-knot nematodes in Bulgaria has been compiled. After analysing the problems and according to the innovative practices, methods to control a given root-knot nematode species in a certain crop were indicated. The studies enabled an inventory of potential alternative measures for integrated management and the creation of a dataset that will allow for the improvement of plant health and the reduction of dependence on chemical pesticides in the production of Solanaceae vegetables.

Key words: alternative measures, root-knot nematodes, Solanaceae vegetable

G8. 1

Spisanie Rastitelna zastita, 1994, Vol. 10, 20-21. ISSN 0204-5893.

A NEW DISEASE WITH THE CAUSATIVE AGENT *PHYLOSTICTA LACTUCAE* APPEARED ON THE LETTUCE

Mariana Nakova, Zhelyu Avramov, 1994.

Abstract

Lettuce is one of the oldest vegetable crops, which is highly valued for its taste, nutritional and medicinal properties. Due to the relatively short period until the onset of consumptive maturity, it is attacked by relatively small economically dangerous disease agents. Observations show that the crop exhibits greater susceptibility to fungal phytopathogens when grown in vegetative facilities. Based on the studies and morphological characteristics of the established pathogen, it can be concluded that it is *Phylosticta lactucae* Brezchnew, a new species for our country. Through "in vitro" experiments, chemical means of control were tested, of which the best effect on the pathogen was shown by Perotsin 75 B - 0.2%; Ditan M 45 – 0.2% and Tilt 250 EC – 0.05%.

Key words: lettuce, new pathogen, *Phylosticta lactucae* in Bulgaria

G8. 2

3rd European Bois Noir Workshop Barcelona, 2013, March, 64-65.

GroEL GENE CHARACTERIZATION OF “BOIS NOIR” PHYTOPLASMA FROM SERBIA, BULGARIA AND ITALY

Mitrović J., Contaldo N., Avramov Z, Smiljković M., Bertaccini A., Duduk B., 2013.

Abstract

Stolbur phytoplasma belongs to ribosomal subgroup 16SrXII-A and is associated with ‘bois noir’ disease of grapevine. Sequence and RFLP analyses of 16S rDNA of stolbur phytoplasma show small or no variability among the strains that originate from different parts of the world. However, there are reports of molecular variability in other genes such as *tuf*, *vmp1*, *stamp* and *secY* genes. So far, *tuf* gene is the only gene for which it has been shown that is related to specific herbaceous host and a vector population. Encoded gene for large subunit of molecular chaperonin (*groEL* gene) has already been used as molecular marker for better identification of some bacterial species such as *Salmonella* and *Staphylococcus*, or for characterization of different serotypes of *Streptococcus suis*. In previous reports, RFLP analysis of *groEL* gene was shown to be a useful tool in characterization of aster yellows strains and stolbur phytoplasma from different plant hosts. Therefore, variability of *groEL* gene of previously identified BN strains from Serbia, Bulgaria and Italy was investigated.

Key words: GroEL gene, Bois Noir, characterization, Serbia, Bulgaria, Italy

G8. 3

Proceedings of the VIII Congress on Plant Protection (November 25-29, 2019, Zlatibor, Serbia). IOBC-WPRS, IOBC-EPRS, 2021, 51-55, ISBN 978-92-9067-340-8.

PLUM RUST - SOURCES OF PRIMARY INOCULUM IN BULGARIA

Boris Nakov, Mariana Nakova, Zhelyu Avramov, 2021.

Abstract

Plum rust is widely spread in all regions of the world where plant species from the genera *Prunus* Mill., family *Rosaceae* are grown. Plum is a traditional crop for Bulgaria and first data about plum rust are from the beginning of the XXth century. There are still discussions going on about the role of alternate hosts and the sources of primary inoculums in Bulgaria. Climate conditions in the country during the last decade are characterized with periods of extremely high temperatures and draughts. In such weather conditions transfer of inoculum between alternate and main hosts cannot always be successful. Nevertheless permanent infection source from the causal agent exist in the plum orchards and despite the climate conditions the disease develops regularly. During 2010 plum rust spread epidemically in the pre-Balkan area of the Balkan Mountains and caused early leaf fall during the end of July and August. That was the reason for the monitoring of the health status of plum orchards and for studying the sources of primary inoculum. Surveys were performed in the young 3-4-years old orchards planted with the varieties Stanley, Jo-Jo and Čačanska leptotica, as well as in the older orchards with the traditional variety Kustendilska sinya sliva, which is extremely susceptible to rust. During the autumn of 2010 mass formation of urediniospores and teliospores was observed on the leaves, and on 1-2 year old shoots – cankers on the bark, pale reddish slightly sunken spots, and line-shaped necrotic cracks were formed. Studies carried out microscopically on the phenology development of the rust fungi, in the period 2010 to 2013, point out that: from October to January mycelia mats are found in the cankers and mycelia invades the bark, palisade and parenchyma tissues, and also the wood of the young shoots; during February and March pustules are formed and the first paraphysae and urediniospores are found; during the second half of April and May, when the plum trees leave out, fully developed and ripen urediniospores are massively produced. First rust symptoms are found on the leaves that are close to the cankers on the twigs where the fungus overwinters and sporulates. Data support the statement that the pathogen can overwinter on the trees in the plum orchards, and that it can serve as a permanent infection source.

Key words: Plum rust, overwintering, *Tranzschelia pruni-spinosae*

G8. 4

Seminar of ecology – 2016 with Internatinal participation, 21-21 April, IBER – BAS, Sofia. FARAGO Edit., 2017, 110-117, ISBN: 979-853-476-132-4.

THE EFFECT OF ORGANIC AND CHEMICAL FERTILIZARS ON THE YELDS AND DISEAS RESISTANCE OF TOMATOES – FIELD PRODUCTION

Sergey Bistrichanov, Ivanka Mitova, Zhelyu Avramov, Vanya Lozanova, 2017.

Abstract

Tomatoes are one of the most valuable and widespread crops in the world. This work aims to study the effect of different types of fertilizers (organic and chemical), their norms and methods of application, on the yield and disease resistance of Varietie Rio Grande. The experiment was performed on alluvial

meadow soil in the village Tsalapitsa after pumpkins grown on the same area and according to the same scheme with the following variant: (control - no fertilizer); 100% farmyard manure; 100% chemical fertilizer; 50% farmyard manure + 50% chemical fertilizer), with conventional technology, including irrigation regime and treatment against pests. The results demonstrate that the combined application of organic and chemical fertilizer is the most effective and results in the highest yield (4307.4kg/da⁻¹). There was a moderate development of economically significant diseases during growth (up to 25%). This allows us to make the assumption that the combined application of organic and chemical fertilizer increases the crop yield, regardless of the growth of the leaf mass affected by the disease.

Key words: organic and chemical fertilizer, yield, diseases of tomatoes.

G8. 5

Seminar of ecology – 2016 with International participation, 21-21 April, IBER – BAS, Sofia. FARAGO Edit., 2017, 168-170, ISBN: 979-853-476-132-4.

MONITORING OF VIRAL DISEASES IN INDUSTRIAL VINEYARDS IN BULGARIA DURING THE PERIOD 2011 – 2015

Avramov Zh., M. Laginova, D. Panayotova, 2016.

Abstract

The viruses Tomato ringspot virus (ToRSV), Tobacco ringspot virus (TRSV), Grapevine fanleaf virus (GFLV), Grapevine Fleck virus (GFkV), Arabis mosaic virus (ArMV), Grapevine leafroll virus 1,3 (GLRV 1,3) cause serious diseases of grapevine, spread all over the world in almost all viticultural regions. Their significance is determined by the way of spreading through vectors or in the production of grapevine planting material. ToRSV and TRSV belong to the group of Nepoviruses and are quarantine viruses for Bulgaria and the EU. During the last few years new industrial vineyards have been planted with European and traditional Bulgarian varieties. In order to clarify the phytosanitary status and prevent a possible spread of quarantine pests, the Plant Protection Directorate at the Bulgarian Food Safety Agency (BFSA) is implementing a programme for grapevine quarantine pests. Along with the study of quarantine pests including viral infection by Tomato ringspot virus (ToRSV) and Tobacco ringspot virus (TRSV) the economically dangerous grapevine viruses GFLV, GFkV, ArMV, GVA, GLRV1 and GLRV3 have also been studied. Based on the obtained results, it is confirmed that there is no ToRSV and TRSV on the territory of Bulgaria.

Key words: grapevine, ToRSV, TRSV, monitoring, Bulgaria

G8. 6

COST Action 0807, Proceedings of Management of phytoplasma-associated diseases, Final Meeting Lisboa, 60-61.

MONITORING PROGRAMS FOR QUARANTINE PHYTOPLASMAS ON GRAPEVINE AND FRUIT TREES AND PROBLEMS FOR THE PHYTOSANITARY CONTROL IN BULGARIA

Avramov Z., A. Etropolska, D. Chavdarova, M. Eftenov, M. Laginova, 2013.

Abstract

Apple proliferation (AP), pear decline (PD), apricot chlorotic leaf roll (ESFY) and “flavescence dorée” (FD) phytoplasmas are quarantine diseases described in Annex 1, Part A Chapter II of Ordinance № 1 of

27 May 1998 for phytosanitary control (Corresponding to Dir 2000/29/EC). They are the most economically important diseases in many grapevine and fruit-growing areas of Europe and fruit growing regions in Bulgaria. To verify their distribution in the country to implement adequate control measures, the phytosanitary inspectors from Bulgarian Food Safety Agency annually perform surveys in the country as part of the official monitoring program for quarantine pests on grapevine and fruit trees. Extremely small number of registered insecticides against vectors of phytoplasma and officially controlled stock production plots appears a major problem at the moment.

Key words: monitorings, AP, PD, ESFY, FD, Bulgaria

G8. 7

Spisanie Rastitelna zastita, 1994, Vol. 7, 13-14. ISSN 0204-5893.

RESULTS OF THE OFFICIAL MONITORING OF THE SPREAD OF PHYTOPLASMAS IN FRUIT SPECIES IN BULGARIA

Zh. Avramov, E. Etropolska, D. Chavrarova, 2013.

Abstract

Apple proliferation (AP), pear decline (PD), apricot chlorotic leaf roll (ESFY) are some of the most dangerous quarantine diseases of fruit crops. They belong in Appendix 1, part A, chapter II of Ordinance No. 1 of May 27, 1998 for phytosanitary control. Outbreaks of infections of these phytoplasmas have been found throughout the country. Infected aphids of the family *Psillidae* were found in 13 of all 28 districts of the country. 200 mother trees, 4,600 first-year nurseries, 22,000 second-year nurseries and 20 da of fruiting gardens were destroyed. The results of the analyzes show that one of the main problems in the control against these pathogens is the lack of specialized uterine bases where the source material can be analyzed for possible phytoplasma infections.

Key words: phytosanitary control, AP, PD, ESFY, spread, problems

G8. 8

Spisanie Rastitelna zastita, 2019, 6, 12-14. School for Specialists, ISSN 0204-5893.

PHYTOPLASM YELLOWS IN VINEYARDS – CHALLENGES AND SOLUTIONS

Zhelyu Avramov, 2019.

Abstract

Grapevine yellows is known worldwide and is a dangerous disease that is spread by infected planting material. The variety of symptoms determines the name of phytoplasma diseases on the grapevine. Two types of symptoms are generally distinguished - golden yellowing (Flavescence doree) and black wood (Bois noir). Flavescence doree is a quarantine disease for Bulgaria and until the end of 2018, it was not established on the territory of Bulgaria, while Bois Noir is widespread, thanks to the vectors of the genus *Hyalestes*, *Repralus*, *Ziginiidia*, etc. Unlike Flavescence doree, a large factor in the spread of Bois Noir is weed vegetation. *Convolvulus arvensis* in the conditions of Bulgaria is the main reservoir of stolbur. Using all the knowledge about phytoplasma pathogens, every specialist needs to report these infections to the competent authorities in order to prevent their spread.

Key words: differential diagnosis, FD, BN, specialist school

G8. 9

Management and sustainable development, 3/2022 (94). ISSN 1311-4506 (print).

ANALYSIS OF THE EXTENSIVE GROWING OF CULTIVATED WELL ON NATURAL PUNCHES IN THE KYUSTENDIL AREA

Zhelyu Avramov, 2022

Abstract

A significant part of mushrooms has significant taste qualities and have been a preferred food since ancient times. They can satisfy our micronutrient needs and are a worthy substitute for meat. Wild mushrooms are an integral part of the biocenosis, but are in complex interactions with other natural objects. As the demand for wild mushrooms grows, so does the need to develop more efficient technologies for their cultivation, but these trends are tied to large financial investments. Every year, new highly productive strains are introduced, the growth index is optimized and the fight against pests is improved. One of the mushrooms of interest today is the *Pleurotus* spp. In Bulgaria, claret is successfully grown. The extensive cultivation of the well is ecologically important, and the intensive one is economically justified, due to the use of waste materials for the growth substrate and the short one-month period for the formation of the fruiting bodies. In both productions, there are many problems related to finances, diseases and realization of the production. The purpose of the present study is to analyze and evaluate the cultivation technology of the cultivated well in the Kyustendil region and to draw specific conclusions that will help farmers.

Keywords: *Pleurotus* spp., extensive production, diseases, Kyustendil.

G8. 10

Acta Oecologica Carpatica, 2018, X.I., 85-94.

MONITORING OF THE QUARANTINE PHYTOPLASMIC DISEASES ON THE VINE IN BULGARIA IM THE PERIOD 2012- 2018

Zhelyu Avramov, Mariana Laginova, Dora Panayotova, Ivanka Ivanova, Marko Mihaylov, 2019.

Abstract

In recent years, new industrial vineyards have been established in Bulgaria with European and traditional Bulgarian varieties. In support of producers and to prevent the spreading of new quarantine and economically diseases, the Bulgarian Food Safety Agency developed a monitoring programme. During the 2011–2018, all industrial wine growing regions in the territory of Bulgaria were surveyed. A total of 2150 plant samples and 709 specimens of different species of cicadas, were tested. Total DNA extraction in CTAB buffer and Nested PCR were performed. The results obtained were compared to previous data by 2010. During the observed period only Bois Noir disease was identified in 137 plant samples and 21 cicadas. During the study period, *S. titanus* increased its range in the Northern Bulgaria.

Key words: Quarantine grapevine yellows, vectors, monitoring

G8. 11

Agricultural Science and Technology, 2017, 9(1), p. 45-47.

HOT-WATER TREATMENT OF GLADIOLUS CORMELS AND THEIR SPROUTING

Sergey Bistrichanov, Tsenko Vatchev, Zhelyu Avramov, 2017.

Abstract

A hot-water treatment was used successfully to obtain pathogen-free planting stock from various plants to control some diseases including gladiolus. The objective of this study was to evaluate the effect of hot-water treatments in terms of damaging gladiolus, concerning sprouting and leading to crop losses. Cormels of two gladiolus cultivars, Oscar and Amsterdam, were used for each treatment (temperature x time period) and were immersed in water baths with hot water at 20°C (as control), 45°C, 50°C, 55°C and 60°C for different treatment periods 10, 20 and 30 min and were planted in pots (d = 10 cm) filled with sterile nutrient substrate (peat/soil/perlite in ratio 3/1/0.5). Three replicate pots each containing 10 cormels were used per treatment. The results showed that the increase of the temperature and the extension of exposition duration reduced significantly the percentage of the sprouting plants from both cultivars – more than 80% at 55°C/20min, and Oscar was more resistant to this treatment regime. For phytosanitary purposes two treatment options were considered as non-damaging – 45°C for 30min or 50°C for 20min, wherein the resulting plants showed approximately 90% sprouting. It was concluded that for successful disease control specific hot-water treatment regimes should be established for every particular gladiolus cultivar.

Key words: gladiolus, hot-water treatment, sprouting

E23 - A published university textbook or a textbook that is used on the school network

E23.1

Project 2020-1-RO01-KA203-080398, <https://erasmus-plus.ec.europa.eu/projects/search/details/2020-1-RO01-KA203-080398>. pages 141-168.

„MINERALS“, In Book, Modul 3 “Chemical pesticide-free horticulture“ on the website of the Project.

Zhelyu Avramov, 2023.

Abstract

The use of natural substances as non-chemical approaches for pest control and management is a major challenge posed by the new ecological trends in plant protection activities. Despite the fact that the application of these substances is difficult to implement in intensive agriculture, they find and gain good usability in urban agriculture. In the following pages I will introduce you to the nature of minerals, Baking soda, Copper, Diatomaceous earth, Herbaceous oil, Soap spray and Flour spray and give examples of their application.

Keyword: Minerals, Baking soda, Copper, Diatomaceous earth, Herbaceous oil, Soap spray and Flour spray, Non chemical substance for plant protection.