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**ZİRAAT FAKÜLTESİ**  
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**Tekirdağ**

**2018 yılında Bölümümüz Öğretim Üyelerince gerçekleştirilen Akaemik yayınlarla İlgili Faaliyet Bilgileri tablosu ve yayın listesi aşağıda sunulmuştur.**

<b>Yayın türü</b>	<b>Sayısı</b>
Uluslararası makale	17
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Ulusal kitap	-
Diğer yayınlar	-
Atıflar	180

**A. ULUSLARARASI HAKEMLİ  
DERGİLERDE YAYIMLANAN  
MAKALELER**

**Abbar S., Ö. Sağlam, M.W. Schilling, T.W. Phillips, 2018. Efficacy of combining sulfuryl fluoride fumigation with heat to control the ham mite, *Tyrophagus putrescentiae* (Schrank) (Sarcoptiformes: Acaridae). Journal of Stored Products Research, 76, 7-13., Doi: 10.1016/j.jspr.2017.11.008.**

Sulfuryl fluoride (SF) could not control all life stages of *Tyrophagus putrescentiae* when applied at 23 °C using the highest allowable gas level. Recent work on heat treatments found 40 °C was ineffective against mites unless held for more than 48 h, a heating time that can damage ham quality. The objective of the laboratory trials reported here was to determine the lowest temperature and shortest exposure time at which SF could control mites while staying below the US EPA maximum concentration-time product (CTP) label rate of 1500 gh/m<sup>3</sup>. A 36-h fumigation with a CTP of 1400 gh/m<sup>3</sup> killed 100% of all mite life stages at 40 °C. Mite eggs, which were determined to be the most SF-tolerant life stage, were exposed to lower CTPs of 300 or 1000 gh/m<sup>3</sup>. SF at 40 °C, control was estimated to require up to 125.71 h at 300 gh/m<sup>3</sup> and 60.93 h at 1000 gh/m<sup>3</sup>. Applying heat with SF just below the maximum allowable CTP will increase the efficacy of this fumigant, but also increases the risk of exceeding the legal limit for the gas. However, at target CTPs of either 300 or 1000 gh/m<sup>3</sup>, which would represent preferred commercial application rates of SF, good levels of mite control could not be achieved at 40 °C within a 48-h exposure.

**Key words:** Ham mite, Sulfuryl fluoride, Methyl bromide alternative, Dry-cured ham, High temperature treatment, CTP

**Aysal, T., M. Kıvan, 2018. Tekirdağ ilinde bulunan Tingidae (Hemiptera, Heteroptera) türleri ve yayılışları. Tekirdağ Ziraat Fakültesi Dergisi, 15(3): 1-8.**

Bu çalışma, Tekirdağ ilinde odunsu bitkiler üzerindeki Tingidae familyası türleri ve yayılışlarını saptamak amacıyla yürütülmüştür. Tekirdağ'ın Malkara, Saray, Süleymanpaşa ve Şarköy ilçelerinde, 2011-2012 yıllarında yürütülen survey çalışmalarında gözle kontrol ve darbe yöntemleri kullanılmıştır. Çalışma sonucunda *Corythucha arcuata* (Say), *Corythucha ciliata* (Say), *Monosteira unicastata* (Mulsant & Rey), *Physatocheila confinis* Horváth ve *Stephanitis pyri* (Fabricius) olmak üzere beş Tingidae türü tespit edilmiştir. Bu türlerden *C. arcuata*, *M. unicastata* ve *P. confinis* Tekirdağ ili faunası için ilk kayıttır. *S. pyri* ise ilde en yaygın ve bol bulunan tür olarak belirlenmiştir.

**Anahtar kelimeler:** Tekirdağ, Tingidae, *Stephanitis pyri*, odunsu bitkiler.

**Coskun, F., M. Arıcı , M. Gulcu ,G. Celikyurt, M. Mirik 2018. Physicochemical, Functional and Microbiological Properties of Hardaliye Beverages Produced from Different Grapes and Collected from Different Households. Journal of Agricultural Sciences, 24(2):278-275.**

Twenty-three hardaliye beverage samples were collected from different regions of Kırklareli city in Turkey and five hardaliye samples were produced under laboratory conditions according to traditional methods. Total phenolic compounds, monomeric anthocyanins (malvidin-3-glucoside), volatile acid, ethyl alcohol, total sugar contents, total acidity (lactic acid), pH, color values (L (brightness), a (red-green), b (yellow-blue)), total mesophilic aerobic bacteria, lactic acid bacteria, yeast and mold and coliform counts were determined. Acidity between 0.38 and 0.91%, pH from 3.54 and 4.33, color (L.a.b.) values from 7.57 to 13.74, from 0.71 to 7.68, from 0.73 to 4.50, respectively were determined. Total phenolics from 368.8 to 2647.5 mg L<sup>-1</sup>, ethanol between 0.4 and 6.0% in 7 out of 23 examples, TMAB number 3x10<sup>1</sup> - 3.2x10<sup>6</sup> cfu mL<sup>-1</sup>, LAB 1x10<sup>2</sup> -3x10<sup>5</sup> cfu mL<sup>-1</sup> in 16 out of 23 samples, yeast and mold count 1x10<sup>1</sup> -2,3x10<sup>4</sup> cfu mL<sup>-1</sup> in 18 out of 23 samples were found. According to the results obtained, coliforms and *Escherichia coli* were not found in the analyzed samples. Statistical analysis results revealed that differences between samples were significant (P≤0.01). Given its bioactive characteristics, hardaliye beverage should be produced at large-scale and be recognized by large communities.

**Key words:** Fermentation; Grape juice; Hardaliye; Mustard seeds; Traditional beverage

**Doğanay İ.Ş., P. Agrafioti, A.A. Işıkber, Ö. Sağlam, C.G. Athanassiou, 2018. Immediate and delayed mortality of the larger grain borer, *Prostephanus truncatus* (Horn), on different surfaces treated with thiamethoxam and alpha-cypermethrin. Journal of Stored Products Research, 76, 1-6., Doi: 10.1016/j.jspr.2017.10.003.**

In this study, we evaluated efficacy of alpha-cypermethrin and thiamethoxam on concrete, linen and plastic surfaces, against adults of the larger grain borer, *Prostephanus truncatus* (Horn) (Coleoptera: Bostrychidae), which is an important pest of stored maize in the tropics. Insect mortality was recorded after 1, 3 and 7 days of exposure. Then, separately for each

initial exposure, the surviving individuals were transferred to untreated surfaces and delayed mortality was assessed again 1, 3 and 7 days later. Adult mortality on both insecticide treated linen surface was significantly lower than those on the other surfaces. Regarding delayed mortality, for adults that had been initially exposed for 7 d, complete control was detected 7 d later on plastic and concrete surfaces treated with thiamethoxam, while for alphacypermethrin complete mortality was detected only on plastic surface. Overall, there was a noticeable delayed mortality of *P. truncatus* adults, for all exposures and surfaces, which indicates that even if the insects are removed from the substrate that with either alpha-cypermethrin or thiamethoxam, delayed mortality is more likely to occur than recovery.

**Key words:** *Prostephanus truncatus*, Alpha-cypermethrin, Thiamethoxam, Treated surfaces, Delayed mortality

**Ilbagı H., Cıtır A., Kara A., Uysal M., 2018. Poaceae weed hosts of Yellow dwarf viruses in the Trakya Region of Turkey. EKIN Journal of Crop Breeding and Genetics, 4(2):1-12.**

Trakya Region of Turkey has been one of the important cereal growing areas in Turkey. Previously sporadic and temporary infections of Yellow dwarf viruses (YDVs) have been reported in some parts of Turkey. YDV diseases on cereals however have been prevailing and causing yellowing, dwarfing, reddening and the reduction of grain yield on cultivated cereals since 1999 in the Trakya Region. YDV have been identified and their incidence and the rate of infections were investigated. Barley yellow dwarf virus-PAV (BYDV-PAV) was diagnosed as the most virulent and dominant one as Cereal yellow dwarf virus-RPV (CYDV-RPV) was also identified as another important virus in the area. In order to determine sources of YDVs and their over summering and overwintering hosts among the Poaceae weed species 326 symptomatic weed leaf samples and 82 intact weed plants were collected from road sides and hedge grows of cereal fields in 2010. In second year 357 weed leaf samples, 13 voluntary cereal leaves and 50 intact weed plants were also collected from same sites. Separately 7 aphid species were identified and 5 of them were used for vector transmission tests of YDVs from potted intact weeds to indicator barley (cv. Barbaros) seedlings. As a result of aphid transmissions from 15 weed species, 156 symptomatic barley leaf samples and from 6 weed species, 50 symptomatic barley samples were obtained in 2010 and 2011 respectively. So, totally 902 leaf samples were obtained from 42 weed, 3 voluntaries and 1 indicator barley species. DAS-ELISA and RT-PCR tests on 326 weed samples revealed the corresponding

incidence rates were 54.60% for BYDV-PAV, 7.05% for CYDV-RPV, 5.52% for PAV+RPV, 14.41% for the other YDVs and being 81.59% total rate of virus incidence in weed samples in 2010. Test results on 370 leaf samples also revealed the incidences of BYDV-PAV as 14.86%, CYDV-RPV as 10.81%, PAV+RPV as 7.56% and the other YDVs as 48.91% totally being 82.16% rate of virus incidence from weed and voluntary cereal samples in 2011. Aphid transmitted barley samples revealed the similar incidences of viruses too. For molecular characterization the genomic region containing coat protein (CP) regions of BYDV-PAV and CYDV-RPV were amplified from selected weed species and samples by RT-PCR method. Specific DNA fragments in the sizes of 531 bp and 400 bp were amplified from 45 BYDV-PAV isolates from 24 weed species and 34 CYDV-RPV isolates from 15 weed species respectively. The selected DNA fragments of BYDV-PAV and CYDV-RPV were purified and sequenced for the determination of nucleotide sequences of CP genes of both virus isolates. Partial nucleotide sequences of 20 Turkish PAV weed isolates were determined and compared with other nine BYDV-PAV isolates in databases. Phylogenetic analysis of obtained and published nucleotide and amino acid sequences revealed the identity ranged from 86.67-99.80% and 70.05-99.40% respectively. Partial nucleotide sequences of 6 CYDV-RPV isolates were also compared with seven isolates of CYDV-RPV isolates in GenBank/EMBL. The nucleotide and amino acid sequences revealed the identity ranged from 80.44-95.86% and 62.50-93.33% identities respectively. To our knowledge, this is the first report of YDV's in Poaceae weed hosts in Turkey.

**Key words:** YDVs, BYDV-PAV, CYDV-RPV, weed host, cereal

**Kıvan, M., T. Aysal, 2018. Interspecific competition between *Trissolcus semistriatus* Nees and *Trissolcus simoni* (Mayr.) (Hymenoptera: Scelionidae), egg parasitoids of the sunn pest. *Plant Protection Bulletin*, 58(2): 93-102.**

*Trissolcus semistriatus* Nees and *T. simoni* (Mayr.) (Hymenoptera: Scelionidae) are the most important and common natural enemies of the sunn pest [*Eurygaster integriceps* Put. (Hemiptera: Scutelleridae)]. This study was conducted to determine whether females of *T. semistriatus* and *T. simoni* multiparasitized previously parasitized *E. integriceps* eggs or not and to evaluate interspecific larval competition and adult competition between *T. semistriatus* and *T. simoni*. For this aim, half of host egg mass parasitized by one species and unparasitized were provided to females of other species in choice tests, and a whole egg mass

parasitized by one species were given to other species female in no choice tests. Multiparasitism experiments were applied after one hour, 24 h and 72 h from the first oviposition. To determine adult competition, one each female of *T. semistriatus* and *T. simoni* were released on two egg masses at the same time. All experiments were observed under a stereomicroscope. Multiparasitism rates for both *T. semistriatus* and *T. simoni* were significantly low in the eggs pre-parasitized by another female species in choice test and these rates decreased with the time from the first parasitism, whereas multiparasitism rates were higher in choice test than those of non-choice test. Emergence from multiparasitized eggs was greater for first parasitoid species than for second species. As a result of adult competition tests, female of *T. semistriatus* was found as a superior competitor than *T. simoni*.

**Key words:** Competition, *Eurygaster integriceps*, Scelionidae, egg parasitoids, multiparasitism.

**Köse, S., M. Kivan, 2018. An evaluation on host discrimination and superparasitism in *Trissolcus semistriatus* (Nees, 1834) (Hymenoptera: Scelionidae), egg parasitoid of *Eurygaster integriceps* Put., 1881 (Hemiptera: Scutelleridae). Turkish Journal of Entomology, 42(4): 287-294.**

*Trissolcus semistriatus* (Nees, 1834) (Hymenoptera: Scelionidae) is the most common and important egg parasitoid of *Eurygaster integriceps* Put., 1881 (Hemiptera: Scutelleridae). This study was conducted to determine discrimination *E. integriceps* eggs parasitized by either self or a conspecific female of *T. semistriatus* in choice and nochoice tests, and to establish effect of adult parasitoid density and host density on parasitism in the laboratory in 2016. Female parasitoids did not superparasitize self-parasitized host eggs. However, superparasitism of 18% (significantly lower than the 81% parasitism rate) of the eggs parasitized by another female occurred within 1 h of first parasitism. Superparasitism was significantly lower at 1% in no-choice tests than the 23% recorded in choice tests within 24 h of first parasitism. Parasitism significantly decreased with increasing host egg number, but parasitism did not change with increasing parasitoid density. Therefore, it is concluded that *T. semistriatus* can discriminate between parasitized and unparasitized host eggs, with superparasitism infrequent when females encounter preparasitized host eggs within 48 h of first parasitism.



**Key words:** *Eurygaster integriceps*, host discrimination, intraspecific competition, parasitism, *Trissolcus semistriatus*.

**Köycü, N.D., 2018. Sensitivity stability and fitness of *Botrytis cinerea* isolates to captan. African Journal of Agricultural Research, 13(43):2443-2448.**

The present study investigated the sensitivity and stability of *Botrytis cinerea* isolates collected from vineyards to captan. To determine the stability of sensitivity to captan, *B. cinerea* isolates on fungicide-free potato dextrose agar (PDA) was evaluated after 15 culture cycles. In some isolates with reduced sensitivity to captan, EC<sub>50</sub> value of the isolates did not change compared to that of isolates that were initially sensitive to captan; suggesting that the decrease/increase in the sensitivity to fungicide may be stable. Isolates sensitive to captan adapted to increasing doses of captan by decreasing their sensitivity, and this adaptation remained stable in the fungicide-free medium. The fitness components included mycelial growth rate, sporulation, and virulence of the isolates. There were significant differences between isolates sensitive to captan and those with decreased sensitivity to captan, in terms of mycelial growth rate, sporulation, and virulence. The growth rate of isolates with decreasing sensitivity to captan was as high as the growth rate of those sensitive to captan. However, isolates with decreased sensitivity to captan showed higher virulence than those sensitive to captan, and the difference between these isolates was significant. Sporulation was dependent on the performance of the individual isolates.

**Key words:** Gray mould, sensitivity, captan, fungicide, virulence.

**Köycü, N. D., C. Özer, E. Solak, N. Delen 2018. Infection of *Botrytis cinerea* in Different Fungicide Application Programs in Semillon Grape. Journal of Tekirdag Agricultural Faculty. 15 (03):61-67**

*Botrytis cinerea* can lead to reduction in the yield and quality of table and wine grapes, with high economic losses in the world and also Turkey. In this work was compared fungicide applications in trial vineyard of Semillon cv. with that of several grower vineyards the effectiveness to fruit infection of *Botrytis cinerea* at harvest. Studies were conducted at five sites in Tekirdağ. All fungicide treatments reduced mean *B. cinerea* berry infection when compared to the unsprayed control treatment. Trial programme resulted in at least disease

severity (1.46%) and incidence (5.83%) and this programme was used fungicide at flower stage for *B. cinerea*. The highest disease severity (11.46%) and incidence (31.67%) was noted in Grower I Programme. This is followed by Grower III programme, Grower II programme and Grower IV programme, respectively. The recommendation for control of *B. cinerea* in the Trakya region is to apply one spray at bloom.

**Key words:** Gray mold chemical control, berry infection, vine

**Köycü, N. D., F. Sukut, 2018. Effect of Unregistreted Fungicides to *Fusarium culmorum* on Wheat. Journal of Tekirdag Agricultural Faculty. 15 (02):26-35.**

The importance of pathogen in World and Turkey has been revealed when it was released that *F. culmorum* causes head blight and seedling in wheat (FHB) carrying by seed or soil. It threatens the health of human and animals due to their toxins released by pathogens in grains. The objective of this study is to identify the effectiveness of tebuconazole+metalaxyl-M (Maxim XL 035) and fludioxonil+metalaxyl-M (Certigor 050 FS) unregistreted to the pathogens on wheat. There are a few number of fungicides registreted for seed pathogens of the wheats. The sensitivity of pathogen against the fungicide has been identified by analyzing the effective concentration (EC50) on mycelial development of *F.culmorum* (S-14) isolate known as pathogen. The experiments of efficacy of fungicides on pathogen were carried out both in petri dishes and pots under controlled conditions. In the experiments, the seeds which have been infected by S-14 isolate of the pathogens and obtained from the uninfected Flamura-85 wheat type were used. *In vivo* experiments were conducted by amended and unamended seeds with fungicides and planting to the sterilized soil or planting the clean disinfected seeds with fungicides by infecting the pathogens to sterilized soil at  $1 \times 10^6$  spores/ml. At the end of the experiment, germination rate, plant length, fresh and dry weight measurements, disease severity rate of seeds were measured. EC50 values for tebuconazole+metalaxyl-M and fludioxonil+metalaxyl-M fungicides of pathogen have been identified respectively as 0,55 and 1,57  $\mu\text{g/ml}$ . It has been found that there was a significant difference between the germination, root, coleoptile lengths and disease severity when both fungicides were compared with control in the *in vitro* tests. It was determined that there was a significant difference on plant length, wet and dry weight, and disease severity of both fungicides *in vivo* tests compared to the control.

**Key words:** *Fusarium culmorum*, wheat, fungicide, control

**Mirik, M., Y. Aysan , F. Baysal-Gurel, 2018. Bacterial spot and blight diseases of ornamental plants caused by different *Xanthomonas* species in Turkey. Plant Protection Science, 54(4):240-247.**

Putative strains belonging to *Xanthomonas* spp. causing leaf spot and blight diseases on geranium (*Pelargonium peltatum* and *P. hortorum*), begonia (*Begonia* × *tuberhybrida*), anthurium (*Anthurium andraeanum*), Chinese hibiscus (*Hibiscus rosa-sinensis*), and English ivy (*Hedera helix*) growing in Turkey were isolated. All bacterial strains were classified as Gram-negative, oxidase negative, catalase, levan and starch hydrolysis positive, with hypersensitive reaction positive on tobacco and pathogenic to host plants. Identification of these strains was further confirmed by serological method using ELISA kits, conventional PCR, carbon utilisation, and FAME. Results of the identification showed that 28, 24, 10, 2, and 1 strains were identified as *X. axonopodis* pv. *begoniae*, *X. hortorum* pv. *pelargonii*, *X. axonopodis* pv. *dieffenbachiae*, *X. hortorum* pv. *hederae* and *Xanthomonas* sp., respectively. This is the first report of *X. hortorum* pv. *hederae* on English ivy in Turkey.

**Key words:** bacteria; detection; ornamentals; *Xanthomonas*

**Özder, N., E. Tayat, 2018. Mass production of *Trichogramma pinto* Voegelé using *Ephesia kuehniella* Zeller stored in liquid nitrogen. Journal of Tekirdag Agricultural Faculty 15 (02): 53-57.**

The storage of host eggs in liquid nitrogen may represent an alternative method in the mass production of *Trichogramma*. In order to evaluate the efficacy of egg storage in liquid nitrogen, we examined the parasitism performance and female longevity of *Trichogramma pinto* Voegelé on eggs of *Ephesia kuehniella* Zeller stored in liquid nitrogen for 1, 2, 3, 4, 5 and 6 weeks. After storage two different methods were used unfreeze to eggs. Firstly eggs after taken from the tank, kept in refrigerator for 24 hours and then for 30 minutes at 50 °C in water bath. The second is after the eggs are taken from the tank It was only kept in the refrigerator for 24 hours. In both methods was not significantly different among the treatments. One and two weeks had the highest parasitism.

**Key words:** Biological control, liquid nitrogen, *Trichogramma pinto*

**Özder, N., E. Tayat, 2018. Storage possibilities of *Trichogramma pinto* Voegelé on eggs of *Epehstia kuehniella* Zeller. *Journal of Tekirdag Agricultural Faculty* 15 (01): 45-50.**

In this study, the parasitization rates of *Epehstia kuehniella* Zeller (Lepidoptera: Pyralidae) eggs stored at different times at 0, 4 and 8 ° C by *Trichogramma pinto* Voegelé (Hymenoptera: Trichogrammatidae) and the performance of parasitoids obtained from these stored eggs were examined. Studies have been conducted within a 25±1°C temperature % 60-70 relative humidity and 16 hours light 8 hours dark periods per day. In conclusion of the carried observations, low temperature and storing period have an effect on the development period of the stored *Epehstia kuehniella* eggs, emergence rate, adult female parasitoids lifetime, the number of the parasitized eggs and blackening of the parasitized eggs. Although the data obtained from the studied biological characteristics are very close to each other, the performance has been monitored high in storing +8°C temperature compared to 0 and +4°C temperatures. A fall has been observed in all of the biological characteristics when the period of storing is extended. The highest performance is identified in first week at the all three temperature degree.

**Key words:** *Trichogramma pinto*, *Epehstia kuehniella*, Mass rearing, *Trichogrammatidae*

**Özder, N., Ş. Demirtaş, 2018. The Effect of Adult Nutrition on Parasitization Performance of *Trichogramma evanescens* Westwood (Hymenoptera: Trichogrammatidae). *Fresenius Environmental Bulletin* 27: (12) 8540-8545.**

*Trichogramma* spp. is the most important parasitoids in biological control as egg parasitoids. In this study the effect of adult nutrition on the parasitization rate, longevity and emergence rate of *Trichogramma evanescens* Westwood (Hymenoptera: Trichogrammatidae) were investigated. Honey, grape molasse and royal jelly as main food; with resin (derived from plants), *acacia* nectar, *Paulownia* nectar, red tulip nectar, yellow asphodel nectar, apple syrup, liquid of *E. kuehniella* egg and mashed *E. kuehniella* larvae used as food resources. Feeding on honey and *acacia* nectar (15.73 days), and honey (16.00 days) significantly increased longevity. The shortest longevity of *T. evanescens* was seen royal jelly+mashed +*E. kuehniella* larvae (2.06 days). *T. evanescens*, females that fed on honey (104.8 eggs) and

honey+acacia nectar (96.53 eggs), parasitized significantly more hosts than females that fed on other floral nectars and artificial diets.

**Key words:** *Trichogramma evanescens*, *Ephestia kuehniella*, floral nectar, food, fecundity, longevity.

**Özer, N., A. Kün, H. İlbi, 2018. Detached detached leaf test for evaluation of resistance to powdery mildew in pepper. Agricultural Research and Technology, 14(3): 1-4.**

Powdery mildew caused by *Leveillula taurica* (Lév) G. Arn. is a quite serious disease of pepper varieties (*Capsicum* spp.) worldwide. The use of resistant genotypes can control the disease. Tests of resistance against powdery mildew during pepper breeding studies have been carried out by directly brushing the conidia or spraying a conidia suspension on whole potted plants grown in the greenhouse. High amounts of inoculum, labour and large experimental areas are needed for these tests. The aim of this study was to investigate the possibility of using detached leaves for resistance evaluation. Detached leaves of a sensitive cultivar (Moonset F1) were placed on two different media (water agar and moistened filter paper) in petri dishes, were inoculated using three different methods (direct brushing conidia, spraying conidia suspension in distilled water, and in sterile distilled water). Inoculated leaves were incubated under two different conditions (16 °C for 24h in dark, then 22°C for 14 h light/10 h dark, and 21 °C for 12 h light/12h dark) in a climatically controlled room. The methods were combined with each other. The combination of water agar and moistened filter paper with inoculation by brushing conidia and spraying conidia suspension in distilled water at the second incubation condition gave infected leaf areas of 50% or more with powdery mildew at 25 day after inoculation. The authors suggest that detached leaves might be very practical to assess the resistance of pepper lines against to powdery mildew disease for breeding programmes.

**Key words:** Detached leaves, pepper (*Capsicum annuum*), powdery mildew, resistance test

**Sen, Y., Y. Aysan, M. Mirik, D. Ozdemir, F. Dekens, J. M. van der Wolf, R. G. F. Visser, S.van Heusden, 2018. Genetic Characterization of *Clavibacter michiganensis* subsp. *michiganensis* Population in Turkey. Plant Disease, 102(2):300-308**

The pathogenic gram-positive bacterium *Clavibacter michiganensis* subsp. *michiganensis* (Smith) Davis et al. is the most harmful bacterium to tomatoes in many countries with a cooler climate. Multilocus sequence analysis was performed on five housekeeping genes (*bipA*, *gyrB*, *kdpA*, *ligA*, and *sdhA*) and three virulence-related genes (*ppaA*, *chpC*, and *andtomA*) to determine evolutionary relationships and population structure of 108 *C. michiganensis* subsp. *michiganensis* strains collected from Turkey between 1996 and 2012. Based on these analyses, we concluded that *C. michiganensis* subsp. *michiganensis* in Turkey is highly uniform. However, at least four novel *C. michiganensis* subsp. *michiganensis* strains were recently introduced, possibly at the beginning of the 1990s. The singletons might point to additional sources or to strains that have evolved locally in Turkey.

**Key words:** *Clavibacter michiganensis* subsp. *michiganensis*

**Yücel, S. A., M. Kıvanç, 2018. İstanbul Göztepe Parkı Gül Bahçesinde bulunan zararlı Hemiptera ve Hymenoptera türleri. Tekirdağ Ziraat Fakültesi Dergisi, 15(2): 95-100.**

İstanbul Göztepe Parkı Gül Bahçesinde bulunan zararlı Hemiptera ve Hymenoptera türlerini belirlemek amacıyla 2010-2011 yıllarında bir çalışma yürütülmüştür. Çalışma sonucunda, Hemiptera takımına bağlı 24 tür, Hymenoptera takımına bağlı 2 tür saptanmıştır. Bunlar içerisinde önemli zararlı türlerin; Hemiptera takımından *Macrosiphum rosae* Linnaeus, *Macrosiphum mordvilkoii* Myzaki, *Metopolophium dirhodum* Walker (Aphididae), *Stephanitis pyri* Fabricius (Tingidae), *Nezara viridula* Linnaeus (Pentatomidae); Hymenoptera takımından *Arge ochropus* Gmelin (Argidae) ve *Cladardis elongatula* Klug (Tenthredinidae) olduğu belirlenmiştir.

**Anahtar Kelimeler:** Gül, zararlı böcek, Hemiptera, Hymenoptera, Göztepe Parkı, İstanbul.

**B. ULUSLARARASI BİLİMSEL  
TOPLANTILARDA SUNULAN  
BİLDİRİ KİTABINDA  
(PROCEEDINGS) BASILAN  
BİLDİRİLER**

**Akbay H., A.A. Işıkber, Ö. Sağlam,H. Tunaz, M.K. Er,2018. Efficiency of ozone gas treatment against *Plodia interpunctella* (Hübner) (Lepidoptera: Pyralidae) (Indianmeal Moth) in hazelnut. 12th International Working Conference on Stored Product Protection (IWCSPP), October 7-11, 2018, Berlin, Germany, 695-698s. (Poster presentation).**

In this study, ozone gas at different concentrations (16.7, 33.3 and 66.6 mg/L) were exposed to all biological stages (egg, larva, pupa and adult) placed at top and bottom of the hazelnut for various exposure periods (2, 4 and 6 hours). In biological tests conducted in presence of hazelnuts, 100% mortalities of all biological stages of *P. interpunctella* placed at top of the commodity were obtained at tested ozone concentrations and exposure periods while it was easier to kill the adult and pupa stages than the larva and egg stages. While it was possible to kill 100% of the adults and pupae placed at bottom of the commodity at tested ozone concentrations and exposure periods, 100% mortality of the larvae and eggs were not obtained at any of the ozone treatments. Generally, the mortalities of all life stages of *P. interpunctella* placed at bottom of the commodity for ozone treatments were lower than those placed at top of the commodity. It was easy to kill the pupae and adults of *P. interpunctella* placed at bottom of the commodity while the ozone treatments resulted in low mortalities of the egg and larvae placed at bottom of the commodity. Just as 100% mortalities of the larva and adult stages were not obtained even at the highest ozone concentration for the longest exposure period. In conclusion, in this study, it was observed that ozone gas only at high concentrations can control all biological stages of *P. interpunctella* in hazelnut and therefore could have an alternative potential for methyl bromide in quarantine applications in short application period.

**Key words:** *Plodia interpunctella*, ozone gas, hazelnut, fumigation

**Akçalı S., .A. Işıkber, Ö. Sağlam,H. Tunaz, M.K. Er,2018. Laboratory Evaluation of Turkish Diatomaceous Earths as Potential Stored Grain Protectants. 12th International Working Conference on Stored Product Protection (IWCSPP), October 7-11, 2018, Berlin, Germany, 739-742s. (Oral presentation).**

In this study, efficacy of local diatomaceous earths (DE) collected from different regions of Turkey against stored grain insects, *Sitophilus oryzae* (L.), *Tribolium confusum* du Val. and *Rhyzopertha dominica* (F.), was investigated. For this purpose, biological tests were carried



out at concentrations of 500 and 1000 ppm (mg DE / kg wheat) of 9 local diatomaceous earths and one commercial diatomaceous earth, namely Silicosec® as positive control at  $25 \pm 1$  °C temperature and  $65 \pm 5\%$  relative humidity in wheat. In addition, the studies on some of the chemical and physical analysis of the tested diatomaceous earths (silicon dioxide (SiO<sub>2</sub>) ratio, particle size and adhesion rate on commodity) were also conducted. In biological tests conducted at 500 ppm concentration for 14 days of exposure in wheat the highest mortality rates (97 to 98%) of *S. oryzae* adults were recorded in CB2N-1, AGN-1 and BGN-1 diatomaceous earths, while the highest mortality rates of *T. confusum* adults were obtained from only AGN-1 and BGN-1 diatomaceous earths. In the case of *R. dominica*, the highest mortality rate (64.4%) was recorded only in CB2N-1 diatomaceous earth. At concentration of 1000 ppm for 14 days of exposure in wheat, 100% mortality of *S. oryzae* adults was observed in all tested local diatomaceous earths except FB2N-1 and Silicosec® while mortality rates of *T. confusum* adults ranging from % 95 to %100 were obtained in all tested local diatomaceous earths except FB2N-1, FBN-1 and Silicosec®. In the case of *R. dominica* adults, mortality rates ranging from 80% to 93% were recorded in CB2N-1, CCN-1 and AG2N-1 diatomaceous earths. In conclusion, laboratory bioassays indicated that CB2N-1 and BGN-1 local diatomaceous earths had high efficacy against *S. oryzae*, *T. confusum* and *R. dominica* adults and thus could be potential to be successfully used for controlling stored grain insect pests as a grain protectant.

**Key words:** Turkish diatomaceous earth, wheat, *Sitophilus oryzae*, *Tribolium confusum*, *Rhyzopertha dominica*

**Arap, M, N. Özer, 2018. Determination of seed-borne fungi in some sunflower lines with different tolerance degree to downy mildew disease. AGROSYM, Johorina, Bosna-Hersek, October 4-7, 712p**

The aim of this study was to identify fungi species on pericarps and seeds of sunflower genotypes, which were highly sensitive and tolerant against downy mildew, and their pathogenicities in this study. Five genotypes from each group were tested. Pericarps with seeds were surface sterilized with sodium hypochlorite of 2% for 7 min. and then rinsed in sterile distilled water for two times. Pericarps and seeds were separated using scalpel and were separately placed on Petri dishes containing Potato Dextrose Agar. They were incubated at 23°C in dark for a week. *Alternaria alternata* was determined in seeds and pericarps of all

sensitive genotypes. The presence of *A. infectoria*, *Bipolaris cynodontis*, *Cladosporium cladosporioides* and *Fusarium oxysporum* differed to sensitive genotypes, pericarps and seeds. The highest pericarp and seed rate contaminated with fungi was recorded on sensitive genotypes 2517-A (19%) and 9728-A 16(%), respectively. The pericarps and seeds of tolerant genotypes against sunflower downy mildew were commonly contaminated with *F. culmorum*. However, *A. alternata* was present in three tolerant genotypes and *A. infectoria* was found in one genotype. Among the tolerant genotypes, pericarps and seeds of 13-TR-001 (19%) and TTAE-13-19 (6%), respectively, were contaminated with fungi at the highest rate. In pathogenicity tests by inoculation of pericarps with seeds, *A. alternata* caused disease severity ranged from 24.03% to 33.3%. This range was between 6.31% and 22.7%, 19.37% and 30.7%, 22.25% and 26.27%, 29.03% and 52.03%, 19.37% and 38.7% for *A. infectoria*, *B. cynodontis*, *C. cladosporioides*, *F. culmorum* and *F. oxysporum*, respectively.

**Key words:** Sunflower (*Helianthus annuus L.*), seed-borne fungi, pathogenicity.

**Atabay S., A. Coşkuntuna, 2018. Investigation Effect of Some Plant Activators Against Gray Mould and Black Mould (*Botrytis cinerea* and *Aspergillus niger*) on Grapes in Postharvest. International Science Congress, 09-12 May, Van, TURKEY, 506.**

Blue mould, caused by *Penicillium expansum* and black mould caused by *Aspergillus niger* are common postharvest fungal disease of grape. Nowadays, because of increasing concerns about chemical usage in food and environment, there is renewed interest in nonchemical approaches to postharvest control. This study was conducted to evaluate the efficacy of harpin protein and *Lactobacillus acidophilus* fermentation product and active ingredient with boscalid and azoxystrobin+metalaxyl M + fludioxonil fungicides in postharvest control of grey mould (*B. cinerea*) and black mould (*A. niger*). The conidial suspensions of the pathogens with a density of  $1 \times 10^5$  spore/ml were applied to the wounds opened on the surface of the grapes with the help of micropipettes. Both of plant activators were sprayed on grape clusters one hour before pathogen inoculation. Fungicides were sprayed on grape clusters one hour after pathogen inoculation. Twenty grape clusters were used for each treatment had five replicates. Following the treatment, plastic boxes with treated grape clusters were covered with plastic lids to maintain high relative humidity in the  $24 (\pm 1) ^\circ\text{C}$  for 15 days in climate room. According to the results of the research, harpin protein in the ratio of 65.00 %, *L. acidophilus* fermentation product in the ratio of 66.25 % and boscalid in the ratio of 47,50 %

have been successful against *B. cinerea*. Harpin protein in the ratio of 71,43 %, *L. acidophilus*' s fermentation product in the ratio of 60.00 % and azoxystrobin+metalaxyl M + fludioxonil in the ratio of 89,75 % have been successful against *A. niger*.

**Key words:** Post harvest, grapes, *Botrytis cinerea*, *Aspergillus niger*, plant activators, control

**Aysal, T., M. Kivan, 2018. Notes on Tingidae family in Turkey. International Agricultural Science Congress, May 9-12, 2018, Van, Turkey. (Poster presentation).**

There are a lot of pests, which have economic importance in the agriculture, forest and ornamental plants, within the species of Tingidae family which have wide spread area in the world. Therefore, the researches on species identification, distribution, biology, economic importance and similar topics about this family were also carried out in Turkey. With this study, the status of Tingidae family in Turkey has tried to be revealed briefly through combining the findings about Tingidae family obtained until now. Approximately, 89 species belonging to Tingidae family have been identified in Turkey until now. The most important of these species and of which control is proposed in terms of agriculture is *Stephanitis pyri* (Fabricius, 1775). *S. pyri* should be taken into account especially in apple, pear, quince, cherry, walnut and rose cultivation economically. *Monosteira lobulifera* Reuter, 1888 and *Physatocheila confinis* Horvath, 1905 cause significant damage to almond, as *Galeatus scrophicus* Saund., 1876 to sunflower, and *Monosteira uncostata* (Mulsant & Rey, 1852) to poplar and willow. *Corythucha ciliata* (Say, 1832) and *Corythucha arcuata* (Say, 1832), which were newly recorded in our country, cause significant damage to plane and oak trees respectively and they are known as invasive alien species. Consequently, these species must be carefully monitored in terms of our country's flora and ecology.

**Key words:** Turkey, Tingidae, *Stephanitis pyri*

**Baytekin Ö., Ö. Sağlam, A.A. Işıkber, 2018. Insecticidal Effect of Central Anatolian Region Diatomaceous Earths Against Confused Flour Beetle (*Tribolium confusum* Du Val.) on Stored Paddy. 12th International Working Conference on Stored Product Protection (IWCSPP), October 7-11, 2018, Berlin, Germany, 519-522s. (Poster presentation).**

In this study, insecticidal efficacy of different local diatomaceous earth (DE) deposits obtained Central Anatolian Region in Turkey and commercial DE deposit (German origin), Silicosec® were evaluated against substantial pest on stored grain as *Tribolium confusum* du Val (Coleoptera: Tenebrionidae) at five different concentrations of 100, 300, 500, 900 and 1500 ppm on stored paddy. Mortality of the exposed adults was assessed after 7, 14 and 21 days of exposure. Also progeny productions were assessed after 65 days. The tests were carried out at 25±1 °C temperature, 55±5% R.H. under dark conditions. The most effective DE in a short time were assessed AG2N-1 which caused 97% mortality of *T. confusum* adults at 1500 ppm concentration after 7 days of exposure in paddy. Complete mortality of *T. confusum* adults was recorded on AG2N-1 at 900 ppm for 14 days and treatments of AG2N-1, BGN-1, CBN-1 for 21 days at 500, 900 and 1500 ppm respectively whereas 87% mortality rate was determined for 21 days exposure of Silicosec® at the highest concentrations on paddy. In conclusion, this study indicated that Turkish DE deposits, AG2N-1, BGN-1 and CBN-1 had high insecticidal efficacy in comparison with the commercial Silicosec® and would have potential to be used against insects in the pest management of stored paddy.

**Key words:** Turkish diatomaceous earths, *Tribolium confusum*, toxicity, paddy, Silicosec

**Coşkuntuna, A., 2018. Biological control Possibilities of Downy Mildew on Sunflower. International Agricultural, Biological & Life Science Conference, 2-5 September, Edirne, Turkey.**

*Plasmopara helianthi* is the most destructive fungal disease of sunflower all over the world. Using chemical control causes environmental pollution and resistant fungicide also in the plants. So alternative control possibilities have been investigated about control of *Helianthus annuus*' s downy mildew. This review includes biological control researches of *P. helianthi* on sunflower in the field in the world. Antagonist fungi *Trichoderma harzianum* applied as seed treatment to a highly susceptible sunflower cultivar evaluated for the ability to promote growth and induce resistance in sunflower against downy mildew disease caused by *P. helianthi*. Mycorrhizal fungi and some plant activators applied as soil drenches and foliar sprays, whereas *P. helianthi* infection was obtained by root and cotyledon inoculations of the seedlings.

**Key words:** *Plasmopara helianthi*, sunflower, biological control.

**Eroğlu S., A.A. Işıkber, H. Tunaz, Ö. Sağlam, M.K. Er, 2018. Residual contact toxicity of spinosyn insecticide, spinetoram against granary weevil (*Sitophilus granarius* L.) and Confused flour beetle (*Tribolium confusum* Du val). 1st International Agricultural Science Congress, 9-12 May 2018, Van/Turkey,p589. (Poster presentation).**

In present study, residual contact toxicity of spinetoram suspension applied to wheat grains against *Sitophilus granarius* L. (Coleoptera: Curculionidae) and *Tribolium confusum* Jacquelin du Val (Coleoptera: Tenebrionidae) adults were investigated under laboratory conditions. In laboratory bioassays, *S. granarius* and *T. confusum* adults were exposed to wheat grains sprayed with spinetoram suspension at 0.5, 1, 2.5, 5 and 10 ppm (mg active ingredient/kg commodity) at 26±1 °C temperature, 65±5 % relative humidity and completely dark condition. Knockdown and mortality of the adults were recorded after 1, 3, 5 and 7 day of exposure and 35-40 day later the wheat was examined for progeny production. The suspension treatments at all concentrations after 1 day of exposure resulted in low mortality of *S. granarius* and *T. confusum* adults. Mortality of *S. granarius* and *T. confusum* adults increased after 1 day of exposure period. Spinetoram treatment at 1 ppm and above concentrations after 3 day of exposure resulted in almost 100 % knockdown or mortality of *S. granarius* and *T. confusum* adults and completely hindered their progeny production. On the other hand, 100 % knockdown or mortality of *T. confusum* adults were obtained at 10 ppm concentration of spinetoram treatment after 3 day of exposure. The results obtained from biological tests indicated that *T. confusum* adults generally were more tolerant to spinetoram treatments particularly at low concentrations and exposure times than *S. granarius* adults. In conclusion, spinetoram suspension treatment on commodity would be potential to be used for control of *S. granarius* and *T.confusum*

**Key words:** Spinetoram, *Sitophilus granarius*, *Tribolium confusum*, wheat, residual contact toxicity

**Gültekin M.A., Ö. Sağlam, A.A. Işıkber, 2018. Efficacy of seven Turkish diatomaceous earths against *Callosobruchus maculatus* (F.) (Coleoptera: Chrysomelidae: Bruchninae) on stored chickpea. 12th International Working Conference on Stored Product Protection (IWCSPP), October 7-11, 2018, Berlin, Germany, 746-750s. (Oral presentation).**

In this study, insecticidal efficacy of seven different local diatomaceous earths (DE) obtained from different deposits in Turkey together with two commercial DEs, Silicosec® (Biofa AG-Germany) and Desect® (Ep Naturals America) against *Callosobruchus maculatus* (F.) (Coleoptera: Chrysomelidae: Bruchninae) an important pest of stored chickpea at five different concentrations (100, 300, 500, 1000 and 1500 ppm) was evaluated. The local DEs were coded as BGN, BHN, AG2N, AC2N, CB2N, CCN, FB2N. Mortality of the adults was assessed after 1, 3, 5 and 7 days of exposure, and consequently progeny (F1) production on treated chickpeas was recorded 42 days later. The tests were carried out under laboratory conditions of  $25\pm 1$  °C,  $55\pm 5$  % R.H. in a dark place. The most effective DEs after 1 day of exposure were CCN, AG2N and BHN causing 75%, 59%, 58% mortalities, respectively at 1500 ppm concentration. Silicosec®, Desect®, BGN, AC2N, applied at 1500 ppm concentration achieved 98-100% mortality of *C. maculatus* after 7 days of exposure, showing similar high insecticidal efficacy. The CCN, BHN, AG2N and CB2N caused 97-99% reduction in progeny (F1) production. Generally, increasing concentration significantly reduced the progeny production. In conclusion, this study has shown that three Turkish DEs, namely CCN, AG2N and BHN highly toxic to *C. maculatus* after 3 days of exposure in comparison with commercial DEs Silicosec® and Desect®. These local DEs could be used in the management of pests of stored chickpea.

**Keywords:** Turkish diatomaceous earths, Silicosec®, Desect®, *Callosobruchus maculatus*, chickpea.

**Ilbagı H. 2018. First report of Yellow dwarf virus diseases and their control ways in the cereal growing areas of Turkey. International Agricultural Science Congress. 552, May 09-12, 2018, Van, Turkey.**

Trakya region is one of the most important cereal growing areas of the country. Almost one million ha of arable land, which covers 65% of the region has been allocated to field crops and cereal production. Grain yield usually varies depending on weather conditions as well as pest and diseases incidences. Among of those important infections, Yellow dwarf virus (YDVs) diseases have been spreading in cereal growing. YDVs namely *Barley yellow dwarf virus-PAV* (BYDV-PAV), *Barley yellow dwarf virus-MAV* (BYDV-MAV), *Cereal yellow dwarf virus-RPV* (CYDV-RPV), *Barley yellow dwarf virus-RMV* (BYDV-RMV) and *Barley yellow dwarf virus-SGV* (BYDV-SGV) have been transmitted by aphids persistently and

efficiently in cereal fields and so, YDVs have been spreading steadily and causing destructive epidemics in the cereal growing areas. In order to determine control strategies of YDVs, field trial experiments were conducted during the growing seasons of 2009-2010, 2010-2011 and 2011-2012. Experimental plots were established at 3 different locations of Tekirdağ Province where representing Trakya region. For this purpose, 8 different winter wheat varieties which have been adapted to Trakya Region's agro-ecological conditions sown in different sowing time for the exposure of natural infections of YDVs. The tolerance of 8 different winter wheat varieties against YDVs as BYDV-PAV, BYDV-MAV, BYDV-RMV, BYDV-SGV and CYDV-RPV were determined and those viruses identified by serological and molecular tests. As some winter wheat varieties sown in the Trakya Region were found as tolerant for YDVs but, some winter wheat varieties were susceptible against YDVs. To be able to control of YDVs were determined the significance of late sowing date. So, the most convenient sowing time for the control of YDVs was determined as a November 10 to November 30. Beside usage of resistant and tolerant cultivars to get rid of Poaceae weed host of YDVs by using herbicides and seed decoration with insecticides containing Imidaclopride active ingredient against aphid vectors. It was observed that spraying with registered insecticides to control vector aphids reduced the incidence rate of YDVs in the Trakya Region. As a result of laboratory tests and field trials, practical control ways of YDVs were identified and obtained results have been shared with farmers with conferences and seminars since the year of 2013. The results of this research is the first report for the determination of the control methods for YDVs in Turkey.

**Key words:** YDVs, control strategies, cereal, wheat

**Köycü, N.D. 2018. Effectiveness on seed application of fungicide application for *Fusarium culmorum* on wheat in field conditions. 9th International Conference of Strategic Research on Scientific Studies and Education (9th ICoSReSSE), October 2018 Antalya/Turkey. Full Texts Book, 19-21:165-169. (Oral presentation).**

Wheat is the most produced and consumed grain in the world and in our country. Due to the humid climatic conditions of the Thrace Region, fungal agents cause severe infections in the wheat. *Fusarium culmorum* was determined as a common fungal agent that causes severe infections in the root, crown root, stem and ears for the grain produced in our region. This study was carried out to determine whether the fungicide applications performed in different

periods of wheat against the pathogens had an effect on the seed, before applying seed fungicide application to the wheat for the seed/soil borne related infections of pathogen. Sowing of the *F. culmorum* infected wheat was done and wheat in the tillering period was applied once/twice with the *F. culmorum* licensed fungicides with the active ingredient epoxiconazole+prochloraz. Those seeds, obtained during harvesting, were sterilized with 1% NaOH, and then seed application was carried out with prothioconazole + tebuconazole. 20 seeds were put in a sterile glass petri dish with sterilized blotting paper, damped with distilled water, upon seed application and left to incubate at  $22 \pm 0$  C in the dark. Germinating rate (%), root and coleoptile length (cm), and diseases severity (%) show significant statistical differences ( $P \leq 0.05$ ) with seeds obtained via different applications. It is determined that the number of fungicide applied against *F. culmorum* may change the activity of fungicides used for seed application.

**Key words:** *Fusarium culmorum*, control, fungicide, wheat

**Köycü, N.D. 2018. Effect on *Fusarium Culmorum* of Fungicides Used in Wheat Seed. International Congress on Engineering and Life Science, 26-29 April 2018, Kastamonu/TURKEY. Proceeding Book, 593-601. (Oral presentation).**

*Fusarium culmorum* (W. G. Smith) Sacc. In our country, wheat causes significant yield loss in root, stem, stem and head in the fields. It is the cause of severe infections, especially in moist and climatic conditions. Seed application is important with fungicides. This study was carried out to determine the sensitivity of *Fusarium culmorum* isolates to wheat seed licensed fungicides and the effect of fungicides on pathogens, which were obtained from the wheat cultivation areas of Trakya Region. It has been determined that the *F. culmorum* isolates differed in sensitivity to prothioconazole+tebuconazole, tebuconazole and carboxine+thiram effective fungicides used in seed spraying and  $EC_{50}$  values were changed according to fungicides or isolates. Germination seeds and plant height (cm) and disease severity (%) were found to be significantly different ( $P \leq 0.05$ ) effect of fungicides used on seed when compared with control.

**Key words:** Wheat, *Fusarium culmorum*, fungicide, sensitivity



**Mirik M., C. Ayvaz 2018. Determination of *Pseudomonas savastanoi* from oleander in Tekirdag of Turkey. VIII International Scientific Agriculture Symposium-AGROSYM2018. 1122-1124, Jahorina-Bosnia and Herzegovina.**

*Pseudomonas savatanoi* is the causal agent of bacterial knot disease. These bacteria is thought to result from abnormal plant cell multiplication at the infection site in response by the host to large amount of indole-3-acetic acid (IAA) or cytokinin produced by pathogen. Bacterial knot has a lot of host range such as olive, oleander, jasmine, fontanesia, privet, myrtle and pomegranate plants. Bacterial knot disease is one of the most important and common disease. The aim of study was isolation and identification with pathogenicity and biochemical tests of disease agent *Pseudomonas savastanoi* from oleander. So in spring 2017, we obtained some samples of oleander leaves and branches with small ground galls in Tekirdağ province of Turkey. To investigate the variability of *Pseudomonas savastanoi* population, twenty one strains of the bacterium were isolated in Tekirdağ from oleander. The strains were exposed to Gram reaction, levan production on 5% saccharose nutrient agar (SNA), oxidase, pectolytic activity, arginine dihydrolase reaction, hypersensitive reaction on tobacco leaves and pathogenicity test on oleander plant. As result of tests twenety one bacterial strains from oleander produced knots on host species were tested, all strains were pathogenic on oleander plants. They were negative for levan, oxidase, arginine dihydrolase, pectolytic activity and positive for hypersensitive reaction on tobacco leaves. According to results of this study, bacterial knot disease determined and all strains were allocated in the LOPAT 1b with biochemical tests.

**Key words:** *Nerium oleander*, oleander, bacterial knot

**Özer, N., A. Kün, H. İlbi, 2018. Detached detached leaf test for evaluation of resistance to powdery mildew in pepper. AGROSYM, Johorina, Bosna-Hersek, October 4-7, 711p.**

Tests of resistance against powdery mildew (*Leveillula taurica*) during pepper (*Capsicum* spp.) breeding studies were carried out by spraying a conidia suspension on whole potted plants grown in the greenhouse. High amounts of inoculum, labour and large experimental areas were needed for these tests. The aim of this study was to investigate the possibilities to use of detached leaves placed on different media and maintained under different conditions. Detached leaves of an 80-day-old from sensitive cultivar (Moonset F1) were used during the

experiments. Leaves were surface-sterilized with 70% ethanol, then rinsed in sterile distilled water. After drying on sterile filter paper, leaves were placed bottom side up in petri dishes containing water agar (A) or moistened filter paper (B). Leaves were inoculated with conidia using three different methods: slight brushing of conidia from sporulating zones onto the leaf (a), spraying conidia suspension ( $1 \times 10^5$  conidia/ml) in distilled water (b) and in sterilized distilled water (c). Petri dishes sealed with parafilm were kept in two different conditions: 16°C for 24 h in dark, then at 22°C for 14 h light/10 h dark photoperiod (I) and 21°C for 12 h light/12 h dark photoperiod in a climatically controlled room (II). The methods were combined with each other. First limited sporulation was observed on leaves in the method combination AbI at one week after inoculation, but symptoms then developed slowly. Sporulation started at 15 days after inoculation in the method combinations, AaII, AbII, BaII and BbII, and these methods gave infected leaf area of 50% or more with powdery mildew at 25 days after inoculation. The authors suggest that detached leaves test might be very practical to assess the resistance of pepper lines against to powdery mildew disease for breeding programme.

**Key words:** Pepper (*Capsicum annuum*), powdery mildew, resistance, detached leaves.

**Özer, N., H. İ. Uzun, M. Akkurt, C. Özer, S. Aydın, 2018. Sporulation area analysis for resistance assessment to downy mildew in grapevine leaves. AGROSYM, Johorina, Bosna-Hersek, October 4-7, 713p**

Foliar test in the laboratory is a practical way to ensure the need of a specific environment for disease development and to screen a large number of genotypes. In this study, fifty genotypes were tested for their resistance to downy mildew (*Plasmopara viticola*) on detached leaves by measuring sporulation area (mm<sup>2</sup>) and determining sporulation severity as visual. F1 individuals of Alphonse Lavallée (table grape cultivar and sensitive) x Regent grape (wine grape cultivar and highly resistant) crosses were used as plant material. Sporangia of the pathogen isolate were collected from a single sporulation lesion on Cabernet Sauvignon. The detached leaves were surface-sterilized with 70% ethanol, then rinsed in sterile distilled water. After drying, leaves were placed upside down on water agar in petri dishes. Ten droplets (20 µl each) of sporangia suspension ( $4 \times 10^5$  sporangia/ml) were deposited on leaves. Sealed petri dishes were held at 22°C and 100% relative humidity for 24 h in the dark, then under 16 h light and 8 h dark photoperiod for 7 days. Sporulation severity (%) was rated using a 0-4

scale based on the level of sporulation ranging from no reaction at all and necrotic reaction to profuse and unlimited sporulation. Area of sporulation (mm<sup>2</sup>) was measured using analysis software program under a stereomicroscope. No sporulation was revealed in five genotypes. The genotypes had different resistance levels ranging from 0% (extremely resistant) to 100% (extremely sensitive) and 0 mm<sup>2</sup> (extremely resistant) to 28.60 mm<sup>2</sup> (extremely sensitive) for sporulation severity and sporulation area, respectively. There was highly significant correlation between two evaluation methods ( $r=0.92$ ,  $p<0.01$ ). However, some of the genotypes showed high sporulation severity but narrow sporulation area, or vice versa. Authors suggest that the measurement of sporulation area is an efficient method for the rapid and reliable assessment of genotypes for their resistance to downy mildew.

**Key words:** Grapevine, downy mildew, foliar resistance, sporulation area.

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**Sağlam Ö., B. Yolcu, A. Alan, A.A. Işıkber, 2018. Karınca mücadelesinde Türk Diatom toprağının kullanım olanakları. 4. Uluslararası Biyosidal Kongresi, 25-29 Mart 2018, Antalya, (Sözlü sunum).**

Hymenoptera takımı, Formicidae familyası içinde sosyal yaşayan böcekler arasında yer alan karıncalar, kentsel yaşamda hem kapalı hem de açık alanlarda insanları ısırması, sokması ve bazı hastalıkları taşıması bakımından potansiyel zararlılardır. Kentsel alanların dışında hayvan barınakları, kümesler ve her türlü gıda maddesi bulunan ürün depolarında ürünleri taşıması, paketleri delmesi ve insanları rahatsız etmesi bakımından önem taşımaktadır. Mücadelesinde karınca yemi bulunan istasyonların yanı sıra yapılan yüzey ilaçlamaları ile kontrol altına alınmaktadır. Ancak kullanılan pestisitlerin insan ve çevrede meydana getirdiği toksisite riskleri bakımından çevre dostu alternatif mücadele yöntemi arayışı her zaman devam etmektedir. Bu kapsamda önemli bir alternatif Diatomit toprağı (Diatomaceous Earth, DE) kullanımınıdır. Bu çalışmada bazı yerel diatom toprakları ve bir karışımının kaldırım karıncası (*Tetramorium* sp.) türüne toksisitesi araştırılmıştır. 9 cm çapında petri kabında oluşturulan beton yüzeyde yürütülen çalışmalarda ACN-1, BHN-1, BGN-1 ve karışım K13 kodlu yerel diatomlar ile Silicosec ticari preparatı kullanılmıştır. Uygulamayı takip eden 6, 12

ve 24 saat sonra ölü ergin karınca sayımları yapılmıştır. Denemeler sonucunda tek diatom uygulamalarında ölüm oranları 6 saat sonra % 40-60 arasında değişirken, 24 saat sonra % 100'e ulaşılmıştır. Karışım diatom K13 uygulamasında ise % 100 ölüm 6 saat sonra sağlanmıştır. Çalışma sonucunda ele alınan yerel diatom topraklarının ve karışımın karınca kontrolünde kullanım potansiyelinin yüksek olduğu sonucuna varılmıştır.

**Anahtar Kelimeler:** Karınca, Diatom toprağı, Silicosec, kontak etki

**Şenses, İ. M., M. Akkurt, N. Özer, H. İ., Uzun, C. Özer, S. Aydın, 2018. Confirmation of RPV3 resistance gene markers in downy mildew resistant hybrids with inoculation tests in “Alphonse Lavalleé x Regent” cross. International Congress on Agriculture and Animal Science, Alanya, Türkiye, November 7-9, 1028-1032p.**

In recent years, studies for identifying resistance to fungal diseases in grape have been accelerated with biotechnological methods, which have begun to be used in grapevine breeding. The use of molecular markers associated with disease-resistance, defined as the Marker Assisted Selection, for early selection in grapevine, breeding studies has begun to take precedence over vineyard research in the world. Downy mildew and powdery mildew are the main fungal diseases that cause significant damage in viticulture of Turkey. Therefore, developing grape cultivars, which have resistant to downy mildew are amongs the priority issues in grapevine breeding studies of Turkey. In this research, it was aimed to confirmation RPV3 (Resistant *Plasmopara viticola*) related markers via inoculation test for using in Marker Assisted Selection studies. For this purpose, ‘Alphonse Lavalleé’, which is the most preferred table grape cultivar in Turkey and ‘Regent’, which was registered for commercial purpose in 1996, resistance against both diseases downy and powdery mildew were used. Two hundred hybrid progenies were genetically analyzed. Two SSR markers (GF18-06 and GF18-08) developed from the downy mildew resistance locus RPV3 were used in the study. Allele sizes of PCR amplification products were determined in AATI Advanced Analytical Fragment Analyzer. The results of the inoculation test were confirmed with genetic analyses.

**Key words:** Grapevine breeding, downy mildew, marker assisted selection, RPV3, Turkey.

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**Tavukçu A., A. A. Işıkber, M.K. Er, Ö. Sağlam, H. Tunaz, 2018. Microwave radiation treatment for controlling cowpea weevil (*Callosobruchus maculatus* (Fabricius)) on stored chickpea. 1st International Agricultural Science Congress, 9-12 May 2018, Van/Turkey, p 576. (Poster presentation).**

In this study, the experiments were conducted to determine efficiency of microwave radiation treatments in a kitchen-type and industrial conveyor belt type microwave oven against all biological stages of cowpea weevil (*Callosobruchus maculatus* (Fabricius)) on stored chickpea and their effects on chickpea quality. In biological tests conducted in kitchen type microwave oven, 100 % or close to 100 % mortality of all biological stages of *C. maculatus* on chickpea was achieved by 720 W 40 s and 900 W 40 s microwave treatments while surface temperatures of chickpea for these treatments were determined to be 64.8 and 69.9 °C respectively. In biological tests conducted in industrial conveyor belt type microwave oven, all microwave exposure periods (62 s, 72 s, 90 s, 100 s) at 800 W power produced the mortalities ranging from 98.7 % to 100 % of its biological stages with 72.7, 81.5, 90.6 and 97.4 °C of surface temperature on chickpea respectively, while all microwave exposure periods at 600 W power produced the mortalities ranging from 92.5 % to 100 % of biological stages with 59.8, 72.7, 78.9 and 84.9 °C of surface temperature respectively. Generally, in both kitchen-type and industrial conveyor belt type microwave oven germination rate of chickpea significantly decreased with increasing both microwave power and exposure time. However, total protein content of chickpea was not affected by microwave treatments. In conclusion, this study indicated that microwave disinfestation of *C. maculatus* on chickpea could have a great potential to be an alternative for chemical disinfestation methods.

**Key words:** Microwave radiation, *Callosobruchus maculatus*, chickpea, stored product insects

**Tingiş A., A.A. Işıkber, Ö. Sağlam, H.Bozkurt, İ.Ş.Doğanay,2018.Screening of Phosphine Resistance in *Sitophilus oryzae* (L.) (Rice Weevil) Populations in Turkey. 12th International Working Conference on Stored Product Protection (IWCSPP), October 7-11, 2018, Berlin, Germany 1017-1021s. (Oral presentation).**

In this study, the status and prevalence of phosphine resistance in *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae) populations collected from Mersin and Konya Province in

Turkey were investigated by conducting the discrimination concentration tests and the concentration–mortality bioassays. Discriminating concentration tests showed that 89.9 and 83.3 % populations of tested total *S. oryzae* populations collected from Mersin and Konya province respectively were resistance to phosphine, which reveals high prevalence of phosphine resistance in the insect sampling locations of both provinces. Moreover, discrimination low concentration (0.04 mg/l) tests indicated that 62.5 and 33.3% of total *S. oryzae* populations collected from Mersin and Konya province respectively had 90% or above survival rate, which showed that the frequency of high phosphine resistance in *S. oryzae* populations collected from Mersin province was higher than that in *S. oryzae* populations collected from Konya province. The concentration–mortality bioassays indicated that there were significant differences in resistance levels of *S. oryzae* populations collected from different provinces. Based on the resistance factors (RF) calculated by LC<sub>50</sub> values *S. oryzae* populations from Mersin and Konya province were 102- to 104-fold and 38- and 81-fold resistance to phosphine compared with susceptible *S. oryzae* population, respectively. The highest level of phosphine resistance was determined in *S. oryzae* populations from Mersin province, followed by those from Konya provinces, respectively. These results indicated that *S. oryzae* populations from Mersin province had higher phosphine resistance than those from Konya Province. In conclusion, this study showed that high levels of phosphine resistance in *S. oryzae* populations collected from different grain storages in Mersin and Konya province of Turkey were prevalent.

**Key words:** Phosphine resistance, *Sitophilus oryzae*, populations, discrimination concentration, Turkey

**Uzun, H. İ., N. Özer, M. Akkurt, C. Özer, S. Aydın, B. Aktürk, 2018. Gibberellic Acid and Plastic Box Combination Improve Seed Germination of Hybrid Seeds in Grapes. International Agricultural Science Congress, Van, Türkiye, May 9-12, 397p.**

Abstract: Improving germination parameters of hybrid seeds are useful in increasing the breeding success. hybrid grape seeds have a lower germination rate ranging from 37% to 60%, depending on pollen sources. The main goal of this study was to improve germination parameters of Alphonse Lavalle x Regent hybrid seeds by treating with Gibberellic acid (GA3, 1000ppm), Benzylaminopurine (BAP, 1000ppm) and Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>, 1 M) and then by germinating in plastic boxes with high air humidity. Seeds were soaked in GA3,

BAP, H<sub>2</sub>O<sub>2</sub> solutions and water (control) for 24 hours after stratification (4 months at 5 °C) and then sown in Perlite:Peat moss (1:1) potting soil. Germination was carried out in the plastic boxes with constant temperature (27 °C) and relative humidity (99%). Total Germination (TG), Germination Speed (GS) and Germination Period (GP) were calculated. Seed germination started on the eleventh day after sowing and continued until the 31st day. Total germination ranged from 60.39% to 78.32% in the control and GA<sub>3</sub>, respectively). GA<sub>3</sub> significantly increased total germination when compared to the other treatments. The germination speed varied from minimum of 1.79 in BAP to the maximum of 2.91 in GA<sub>3</sub> treatment. Chemical treatments had no significant effect on the germination periods which ranged between 11 days in BAP+GA<sub>3</sub> combination and 18 days in the control treatment. The results of the study indicated that the rate and speed of germination of hybrid grape seeds could be increased by GA<sub>3</sub> applications just before sowing and then growing the seedlings in plastic boxes with high humidity (99%) and air temperature (27°C).

**Key words:** Vinifera, vitis, germination, seedling, stratification

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**Yörük B., C. Ayvaz, M. Mirik, 2018. Effect of antagonist bacteria against walnut bacterial blight disease in *in vitro* conditions. VIII International Scientific Agriculture Symposium-AGROSYM2018. 1081-1083, Jahorina-Bosnia and Herzegovina.**

Walnut (*Juglans* spp.) crops are among the most economically important tree crops worldwide and cultivated to a different extent in all conditions. Bacterial blight (*Xanthomonas arboricola* pv. *juglandis*) is one of the main diseases of walnut that reduce the yield. Bacterial symptoms have been reported on all succulent tissues such as shoots, leaves, buds, female flowers, catkins and nuts. The walnut leaves are more susceptible than other plant parts. Points of infection begin as water-soaked areas which develop into brown necrotic areas. Walnut bacterial blight is difficult to control because the bacteria overwinter and survive in dormant buds. So biological control is very important against walnut blight. The aim of this study was to determine whether bacterial antagonist could be used to control *Xanthomonas arboricola* pv. *juglandis*. In total, 69 potentially bacterial antagonists were isolated of healthy walnuts leaves. These samples were screened for their biological control activity against

*Xanthomonas arboricola* pv. *juglandis* with dual culture methods in in vitro conditions. As a result of these study 48 antagonist bacterial strains obtained effective against *Xanthomonas arboricola* pv. *juglandis* with inhibition zone diameter ranging from 4.6 to 16.6 mm. Interestingly, among 21 effective antagonist bacteria, all of them totally inhibited the growing ability of pathogen *Xanthomonas arboricola* pv. *juglandis*. We clearly observed that these antagonist bacteria have a higher efficacy for *Xanthomonas arboricola* pv. *juglandis* biocontrol.

**Key words:** *Xanthomonas arboricola* pv. *juglandis*, juglan, biological control, dual culture method



**D. ULUSAL HAKEMLİ  
DERGİLERDE YAYIMLANAN  
MAKALELER**

**E. ULUSAL BİLİMSEL  
TOPLANTILARDA SUNULAN VE  
BİLDİRİ KİTAPLARINDA BASILAN  
BİLDİRİLER**

**Köycü, N.D. 2018. *F. culmorum*'un tohum kaynaklı enfeksiyonuna karşı arpa çeşitlerinin reaksiyonu. Uluslararası Katılımlı Türkiye 6. Tohumculuk Kongresi, 10-13 Eylül 2018 Niğde, Türkiye. Bildiriler Kitabı, 170-176. (Sözlü sunum)**

Tahıllar grubuna giren Arpa (*Hordeum vulgare* L.) taneleri malt, hayvan yemi ve insan beslenmesinde de kullanılan önemli bir üründür. *Fusarium culmorum* (W.G. Smith) Saccardo tohum/toprak yolu ile taşınan kök ve kök boğazı, sap çürüklüğü (FCR) başak yanıklığı (FHB) olarak da bilinen arpa (*Hordeum vulgare* L.) ve buğdayı (*Triticum aestivum* L.) da içine alarak hububatın önemli fungal bir patojenidir. *F. culmorum* S-14'ün tohum kaynaklı enfeksiyonlarının arpa çeşitlerinde (Anatolia, Bolayır, Martı, Bosut, KH Korsu, Sladoron, Harman, Sitona, Verdan) fide gelişimi üzerine etkisi *in vitro* koşullarda araştırılmıştır. Tohum inokulasyonu için *F. culmorum* S-14 izolatu 12/12 saat karanlık/aydınlık koşullarda 22oC'de 12 gün süre ile içinde PDA (Potato Dextrose Agar, Merck) bulunan besi ortamında kültüre alınmıştır. Arpa tohumları %1'lik sodyum hipoklorit ile yüzey dezenfeksiyonuna tabi tutularak bu petri kaplarında 1 gün süre ile bekletilerek tohum inokulasyonu yapılmıştır. İnokulasyondan sonra enfekteli tohumlardan gelişen fidelerde ve kontrollerinde enfeksiyonun fide gelişimi üzerine etkisini tespit etmek amacıyla kök uzunluğu (cm), koleoptil uzunluğu (cm), çimlenme oranı (%) ve hastalık şiddeti (%) değerlendirmesi yapılmıştır. Hastalık şiddeti değerlendirmesi 0-4 skalası kullanılarak yapılmıştır. *F. culmorum* ile enfekteli tohumların kök ve koleoptil uzunluğunda kontrole göre farklılık tespit edilmiştir. Enfekteli tohumlarda çimlenme oranı % 65,5 ile % 90 arasında ve en düşük çimlenme oranı Anatolia çeşidinde tespit edilirken, hastalık şiddeti % 25-76 arasında tespit edilmiş ve en yüksek hastalık şiddeti ise Harman çeşidinde belirlenmiştir.

**Anahtar Kelimeler:** arpa, *F. culmorum*, fide, sap çürüklüğü, tohumla taşınma

### **Reaction of Barley Varieties Against to *F. Culmorum*'s Seed-Borne Infection**

Barley (*Hordeum vulgare* L.) grains including the cereals group are an important ingredient used in malt, animal feed and human nutrition. *Fusariumculmorum* (W.G. Smith) Saccardo is a important pathogen soil/seed-borne fungus and able to cause devastating diseases foot and root rot also known as crown rot (FCR) as well as head blight (FHB) in small grain cereals, including barley (*Hordeumvulgare* L.) and wheat (*Triticumaestivum* L.). The effects of *F. culmorum* on seedling growth in barley (Anatolia, Bolayır, Martı, Bosut, KH Korsu, Sladoron,

Harman, Sitona, Verdan) varieties for seed-borne infections of S-14 were investigated *in vitro*. For the seed inoculation procedure a highly pathogenic isolate *F. culmorum* (S-14) was cultured on petri dishes containing PDA (Potato Dextrose Agar, Merck) medium and incubated for 12 days prior to infection under controlled conditions at 22 °C for 12/12 h of day/night cycle. Then, barley seeds were carried out in these petri dishes for 1 day for seed inoculation after surface disinfection with 1% sodium hypochlorite. After inoculation, 20 seeds of each petri dish were placed in sterile petri dishes containing sterile 4-fold sterilized drying paper and incubated at 22 °C for 7 days. After incubation; root length (cm), coleoptil length (cm) germination rate (%) and disease severity (%) of infected seed and control seedlings were assessed in order to determine the effect of infection on seedling development. For visual disease severity, *F. culmorum* disease symptoms were assessed using a scale 0-4. Differences were found when comparing the length of *F. culmorum* infected seeds to the control length of coleoptiles. The germination rate in infected seeds was between 65.5% and 90% and the lowest germination rate was determined in the Anatolia variety. The disease severity was determined between 25-76% and the highest disease severity was determined in the Harman variety.

**Key words:** barley, *F. culmorum*, seedling, crown rot, seed-borne

**Kervanda S., A.A. Işıkber, A. Bayram, Ö. Sağlam, 2018. Hardal uçucu yağı Ve ana bileşiğinin tek başına ve değiştirilmiş atmosfer uygulamaları ile kombinasyonun Kırmı un biti, *Tribolium confusum* du Val (Col.: Tenebrionidae)'ne karşı fümigant etkisi. Türkiye VII. Bitki Koruma Kongresi (Uluslararası Katılımlı), 14-17 Kasım 2018, Muğla, Türkiye, 35s. (Sözlü Bildiri).**

Bu çalışmada hardal uçucu yağı ve bunun ana birleşiminin (allyl isothiocyanate) yüksek konsantrasyonlu karbondioksit (CO<sub>2</sub>) ve nitrojen (N<sub>2</sub>) ile kombinasyonun *Tribolium confusum* du Val (Col.: Tenebrionidae)'un tüm biyolojik dönemlerine karşı fümigant etkinlikleri belirlenmiştir. Ön biyolojik test sonuçları tek başına 10 ml/l konsantrasyonda hardal uçucu yağ ve allyl isothiocyanate uygulaması %92 CO<sub>2</sub> ve N<sub>2</sub> ile kombinasyonuna ihtiyaç kalmadan *T. confusum*'un tüm biyolojik dönemlerin %100 ölümüne neden olduğunu göstermiştir. Lethal konsantrasyon denemeleri sonunda hardal uçucu yağ ve allyl isothiocyanate'in %92 CO<sub>2</sub> ve N<sub>2</sub> ile birlikte uygulaması yumurta dışında *T. confusum*'un tüm gelişme dönemlerine ait LC<sub>50</sub> ve LC<sub>90</sub> değerlerinde 1.02 ila 7.28 arasında değişen oranlarda önemli azalmalara neden

olmuştur. Genel olarak hardal uçucu yağı ve bileşeni (allyl isothiocyanate) %92 CO<sub>2</sub> ile kombinasyonun *T. confusum*'un tüm gelişme dönemlerine karşı hardal uçucu yağların ve bileşenin %92 N<sub>2</sub> ile kombinasyonuna göre daha toksik olduğu belirlenmiştir. Biyolojik testler sonunda test edilen hardal uçucu yağı ve bunun ana bileşiğinin (allylisothiocyanate) yüksek konsantrasyonda CO<sub>2</sub> ve N<sub>2</sub> gazlarıyla birlikte uygulanmasının *T. confusum*'un gelişme Dönemlerine ait toksisite değerlerinde önemli azalmalara neden olduğu ve dolayısıyla CO<sub>2</sub> ve N<sub>2</sub> kullanımının sinerjistik etki gösterdiği görülmüştür. Sonuç olarak bu çalışma hardal uçucu yağı ve bunun ana bileşiğinin (allyl isothiocyanate) değiştirilmiş atmosfer ile kombine edilerek uygulanmasının depolanmış ürün zararlılarının mücadelesinde konvansiyonel fümigantlara umut verici potansiyel alternatif olabileceğini göstermektedir.

**Anahtar kelimeler:** Uçucu yağ, hardal, allyl isothiocyanate, değiştirilmiş atmosfer, *Tribolium confusum*, fumigant

**Fumigant toxicity of mustard essential oil and its main compound alone and combinations with modified atmosphere treatments against confused flour beetle, *Tribolium confusum* du Val, (Col.:Tenebrionidae)**

In this research, fumigant toxicity of mustard essential oil and its main compound (allyl isothiocyanate) in combination with high concentration (92%) of carbon dioxide (CO<sub>2</sub>) and nitrogen (N<sub>2</sub>) to all life stages of *Tribolium confusum* du Val. (Col.: Tenebrionidae) was evaluated. Preliminary bioassay tests indicated that 10 µL/L concentration of mustard Essential oil and allyl isothiocyanate alone resulted in 100% mortality for all life stages of *T. confusum* without any addition of CO<sub>2</sub> and N<sub>2</sub>. Lethal concentration tests indicated that combinations of mustard essential oil and allyl isothiocyanate with 92% CO<sub>2</sub> produced 1.02 to 7.28 fold reductions in LC<sub>50</sub> and LC<sub>90</sub> values for all life stages of *T. confusum* except the egg stage. Generally, the combinations of mustard essential oil and allyl isothiocyanate with 92% CO<sub>2</sub> were more toxic to all life stages of *T. confusum* than those in combinations with 92% N<sub>2</sub> as evidenced by significant decrements in their LC<sub>50</sub> and LC<sub>90</sub> values. It appears that high concentration of CO<sub>2</sub> and N<sub>2</sub> have a synergistic effect on all life stages of *T. confusum* when exposed to combined mixture of the tested essential oil and its compound. In conclusion, this research indicates that combinations of mustard essential oil and its main compound (allylisothiocyanate) with a modified atmosphere has potential as an alternative replacement of the most commonly used commercial fumigants, methyl bromide and phosphine.

**Key words:** Essential oil, ally isothiocyanate, modified atmosphere, *Tribolium confusum*, fumigant

**Akbay H., A.A. Işıkber, H. Tunaz, Ö. Sağlam, M.K.Er,2018. Ozon gazı uygulamalarının fındıkta *Plodia interpunctella* (Hübner) (Lepidoptera:Pyralidae) (Kuru Meyve Güvesi)'ya karşı biyolojik etkinliği. Türkiye VII. Bitki Koruma Kongresi (Uluslararası Katılımlı), 14-17 Kasım 2018, Muğla, Türkiye,50s. (Sözlü Bildiri).**

Bu çalışmada Kuru Meyve Güvesi, *Plodia interpunctella* (Hübner)'nın tüm gelişme dönemlerine boş hacimde (ürünsüz ortamda) yarım saat aralıklarla kesikli olarak farklı sürelerde (30, 60, 120, 240 ve 360 dakika) ve farklı konsantrasyonlarda (8.4, 16.7, 33.3 ve 66.6 mg/L) ozon gazı uygulanmıştır. Ayrıca, ürünlü ortamda yürütülen denemelerde ürünün alt ve üst kısmına yerleştirilen *P.interpunctella*'nın tüm biyolojik dönemlerine (yumurta, larva, pupa ve ergin) farklı sürelerde (2, 4 ve 6 saat) ve farklı konsantrasyonlarda (16.7, 33.3 ve 66.6 mg/L) ozon gazı uygulanmıştır. Boş hacimde yürütülen biyolojik testler sonucunda düşük ozon konsantrasyonu (8.4 ve 16.7 mg/L) ve uygulama sürelerinde (30 ve 60 dakika) ergin ve pupaların ölüm oranları yüksek bulunurken yumurta ve larvaların ölüm oranlarının oldukça düşük olduğu görülmüştür. Ürünlü ortamda yürütülen denemeler sonucunda ürünün üst kısmında mevcut uygulama süreleri ve konsantrasyonlarında tüm biyolojik dönemlerin % 100 ölümleri elde edilirken ergin ve pupaları öldürmek larva ve yumurtalara göre daha kolay olmuştur. Genelde ürünün alt tarafına konulan *P.interpunctella*'nın gelişme dönemlerinin ölüm oranları üst kısmına yerleştirilen gelişme dönemlerinkinden düşük bulunmuştur. Mevcut uygulama süreleri ve konsantrasyonlarında ürünün alt kısmında, ergin ve pupaları öldürmek kolay olurken, yumurta ve larva dönemlerinin ölüm oranları düşük seviyede bulunmuş ve en yüksek ozon uygulam konsantrasyonu ve süresinde dahi % 100 ölüm oranları elde edilememiştir. Sonuç olarak, bu çalışmada kısa uygulama süresinde yalnızca yüksek konsantrasyonlarda ozon gazının fındıkta *P. interpunctella*'nın tüm gelişme dönemlerini kontrol edebileceği ve dolayısıyla karantina uygulamalarında metilbromide alternatif potansiyele sahip olabileceği görülmüştür.

**Anahtar kelimeler:** *Plodia interpunctella*, ozon gazı, fındık, fümigasyon

**Biological efficiency of treatment of ozone gas against *Plodia interpunctella* (Hübner)  
(Lepidoptera:Pyralidae) (Indian meal moth) in hazelnut**

In this study, ozone gas was treated to all biological stages of *Plodia interpunctella* (Hübner) (Indian meal moth) at various exposure periods (30, 60, 120, 240 and 360 minutes) and at different concentrations (8.4, 16.7, 33.3, and 66.6 mg/L), at intervals of half an hour in empty space. Moreover, in biological tests conducted in presence of hazelnuts, ozone gas at different concentrations (16.7, 33.3 and 66.6 mg/L) were exposed to all biological stages (egg, larva, pupa and adult) placed at top and bottom of the commodity for various exposure periods (2, 4 and 6 hours). Toxicity data for empty space ozone treatments indicated that mortality rates of the adults and pupae were found to be high at low ozone concentrations (8.4 and 16.7 mg/L) and short application periods (30 at 60 minute), whereas mortality rates of the eggs and larvae were very low. In biological tests conducted in presence of hazelnut, 100% mortalities of all biological stages of *P. interpunctella* placed at top of the commodity were obtained at tested ozone concentrations and exposure periods. Generally, the mortalities of all life stages of *P. interpunctella* placed at bottom of the commodity for ozone treatments were lower than those placed at top of the commodity. It was easy to kill the pupae and adults of *P. interpunctella* placed at bottom of the commodity while the ozone treatments resulted in low mortalities of the eggs and larvae placed at bottom of the commodity. Just as 100% mortalities of the larvae and adults were not obtained even at the highest ozone concentration for the longest exposure period. In conclusion, in this study, it was observed that ozone gas only at high concentrations can control all biological stages of *P. interpunctella* in hazelnut and therefore could have an alternative potential for methyl bromide in quarantine applications in short application period.

**Key words:** *Plodia interpunctella*, ozone gas, hazelnut, fumigation

**Gül S., Ö. Sağlam, N. Altaş, A.A. Işıkber, 2018. Yerel diatom toprağı karışımlarının depolanmış tahıl zararlılarına karşı etkinliği. Türkiye VII. Bitki Koruma Kongresi (Uluslararası Katılımlı), 14-17 Kasım 2018, Muğla, Türkiye, 62s. (Sözlü Bildiri).**

Bu çalışmada, Türkiye'nin farklı bölgelerinden elde edilen yerel diatom topraklarının ikili karışımlarının depolanmış tahılların zararlısı, *S. oryzae*, *T. confusum* ve *R. dominica* erginlerine karşı etkinlikleri araştırılmıştır. Bu amaçla buğday üzerinde 9 farklı yerel diatom

toprağı karışımlarının 300, 600 ve 900 ppm (mg/kg) konsantrasyonlarında  $25 \pm 1$  °C sıcaklık and  $65 \pm 5\%$  nispi nemde biyolojik testler yürütülmüştür. İkili diatom toprağı karışımların tüm konsantrasyonlarının 7. ve 14. gün sonunda *S. oryzae*, *T. confusum* ve *R. dominica* erginleri üzerindeki etkinlikleri arasında istatistiki olarak önemli farklılıkların olduğu görülmüştür. Genel olarak ikili diatom toprağı karışımlarının tüm uygulama konsantrasyonları bir arada değerlendirildiğinde *S. oryzae* ve *T. confusum* erginlerine karşı K9 ve K12, *R. dominica* erginlerine karşı ise K1 ve K9 diatomit toprağı karışımları en etkili diatomit toprağı karışımları olduğu görülmüştür. Diatomit toprağı karışımların uygulama konsantrasyonu artıça test edilen böceklerin ölüm oranlarında da önemli artışlar görülmüştür. Diatomit toprağı karışımların yüksek konsantrasyonunda (900 ppm) *S. oryzae* ve *T. confusum* erginlerinin %100 ölümleri K1, K5, K6, K9, K10, K11 ve K12 kodlu diatomit toprağı karışımlarında görülürken hiçbir diatomit toprağı karışımlarından *R. dominica* erginlerinin %100 ölümleri elde edilememiştir. Sonuç olarak bu çalışmada K1 ve K9 kodlu yerel diatom toprağı karışımlarının test edilen üç böcek türünün erginlerine karşı yüksek etkinlik gösterdiği ve dolayısıyla depolanmış tahıl zararlılarının kontrolünde başarılı bir şekilde kullanılabilme potansiyeline sahip olabileceği sonucuna varılmıştır.

**Anahtar kelimeler:** Yerel Diatom toprağı, ikili karışım, Depolanmış tahıl zararlısı, insektisit

### **Efficiency of mixtures of local Diatomaceous Earths against stored grain insects**

In this study, efficacy of binary mixture of local diatomaceous earths (DE) collected from different regions of Turkey against stored grain insects, rice weevil (*Sitophilus oryzae* (L.)), the confused flour beetle (*Tribolium confusum* du Val.) and the lesser grain borer (*Rhyzopertha dominica* (F.)), was investigated. For this purpose, biological tests were carried out at concentrations of 500 and 1000 ppm (mg DE / kg wheat) of 9 binary combination of local diatomaceous earths at  $25 \pm 1$  °C temperature and  $65 \pm 5\%$  relative humidity in wheat. Biological tests showed that there were statistically significant differences in efficacy of binary diatomaceous earth mixtures against adults of *S. oryzae*, *T. confusum* and *R. dominica* adults at the end of 7th and 14th days of DE treatments. In general, when all the results of application concentrations of binary diatomaceous earth mixtures were evaluated together, binary DE mixtures of K9 and K12 against *S. oryzae* and *T. confusum* adults and K1 and K9 against *R. dominica* adults were found to be the most effective DE mixtures. Significant increases were also observed in the mortality rates of insects tested with increasing



application concentration of DE mixtures. At the highest DE mixture concentration (900 ppm), 100% mortality rates of *S. oryzae* and *T. confusum* adults were observed in K1, K5, K6, K9, K10, K11 and K12 DE mixtures while none of DE mixtures resulted in 100% mortality of *R. dominica* adults. In conclusion, laboratory bioassays indicated that K1 and K9 local DE mixtures had high efficacy against *S. oryzae*, *T. confusum* and *R. dominica* adults and thus could be potential to be successfully used for controlling stored grain insect pests.

**Key words:** Local diatomaceous earth, binary mixture, stored grain insects, insecticide