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BOOK OF ABSTRACTS

days may affects aphid host search behavior. To mimic contact between nearby plants, a soft face brush was used to apply light and brief mechanical stimuli on the leaf surface. Maize, bean and potato plants responded to touch by changes morphology and volatile emission. Our treatment did not cause trichome damage nor change their total number on touched terminal leaves. However, gently touching increased density of glandular trichomes and the number of pavement cells on part of leaves that have not been treated. *Rhopalosiphum padi*, *Aphis faba*, *Myzus persicae* and *Macrosiphum euphorbiae* showed significantly reduced acceptance of touched plants compared to untouched controls. Touching altered the volatile emission of treated plants that released higher quantities of specific volatile compounds that were less attracting for *Coccinella septempunctata* then those released by controls. Taken together our studies demonstrated that plant mechanical interaction may have ecological effects beyond the plant itself, affecting organisms at higher trophic levels.

Keywords: Aphids, ladybirds, volatiles, aphid host plant acceptance,

PO088

SOLANUM PANDURIFORME: A PROMOSING BOTANICAL FOR APHIDS CONTROL ON BRASSICAS

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Brassicas are important vegetable crops for home consumption and market gardening in eastern and southern Africa. Productivity is affected by aphids through their feeding and disease transmission. Botanical insecticides can potentially manage aphids, but few plants have been evaluated for use on brassicas. A study was conducted to evaluate the effectiveness of *Solanum panduriforme* to control aphids on brassicas. Extracts from three parts of *S. panduriforme* were assessed for their aphicidal effects on the cabbage aphid, *Brevicoryne brassicae*. Extracts from leaf powder (LP), ripe berry powder (BP), fresh ripe berries (RB) and fresh unripe berries (UB) were extracted with four solvents: water, ethanol, hexane and diethyl ether, using homogenisation, maceration and solvent-assisted / sequential extraction methods. Extracts effectiveness was determined using laboratory bioassays and plant assays in screen house and field conditions. Assays were designed as completely randomized with three or four replications depending on the assay. The immature (LP and UB) parts were generally more effective than the mature (BP and RB) parts; mortalities ranged from 90% down to 67% respectively. Ethanol extracts were more effective than aqueous extracts (LP 96% and 63%; BP 96% and 64%; RB 100% and 64%; UB 100% and 90%). The dried crude extracts from hexane were more effective than di-ethyl ether extracts. Group chemical analysis indicated presence of alkaloids in the berries (BP, RB, UB), and absent in the leaves (LP). Phenolic compounds and flavonoids were present in all the extracts (LP, BP, RB, and UB). Saponins were present in the fresh parts (RB, UB). The locally available *S. panduriforme* plants can be used as an aphicide to control aphids on brassicas. Farmers can directly prepare an easy and cheap botanical insecticide from leaf powder and unripe berries using water. Ripe berries can be investigated further for development of a commercial botanical insecticide.

Keywords: Aphicide, bioassays, brassica, *Brevicoryne brassicae*, effectiveness, extracts, mortality, *Solanum panduriforme*

PO089

TOMATO PROSYSTEMIN: STRUCTURAL AND FUNCTIONAL CHARACTERIZATION

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Systemin (Sys) is a 18-amino-acid peptide hormone which, upon insect attack, is released from its precursor protein, Prosystemin (Prosys) to initiate a complex signaling cascade that leads to the production of defense compounds (Ryan, 2000). The tomato genome contains only one copy of the *Prosys gene*; it is composed of 4176 bp and is structured into 11 exons, of which the last one codes for Sys. Sys peptide was traditionally considered as the principal actor of the resistance towards pests observed in tomato plant overexpressing the ProSys. However, recent evidences (Corrado *et al.*, 2016) suggest that ProSys N-terminal region could contribute to defense response. This observation prompts us to investigate the biochemical and structural features of the Prosys protein. To this purpose Prosys cDNA was amplified, cloned into pETM11 vector and expressed in BL21 (DE3) *E. coli* strain. The recombinant protein was purified by three chromatographic steps: Immobilized Metal Affinity Chromatography, Ion Exchange Chromatography and Size Exclusion Chromatography. After each step of purification, protein purity was assessed on 15% SDS-PAGE. Since the beginning Prosys showed peculiar behavior (Délano *et al.*, 1999) as observed by SDS-PAGE and chromatographic approches. Moreover, bioinformatics and structure prediction tools allowed us to evaluate the intrinsic features of the protein and to analyze the secondary and tertiary structure of the prohormone. The results show, for the first time, that Prosys is an Intrinsically Disordered Protein (IDP) (Buonanno *et al.*, 2017). Finally, plant assays revealed that the recombinant pro-hormone is biologically active being very effective in the induction of tomato defence-related genes, which confer protection against *S. littoralis* larvae both locally and sistemically (Buonanno *et al.*, 2017). To our knowledge, this is the first biotic stress related IDP identified in plants. Studies aimed at a deeper characterization of ProSys function are presently in progress.

Keywords: Tomato, plant defense, precursor, IDP, structural and functional characterization.

PO090

EFFECTS OF THE LEAF GALLING DENSITY OF *GRAPE PHYLLOXERA* ON SANGIOVESE GRAPE PRODUCTIONS

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Daktulosphaira vitifoliae Fitch, the *grape phylloxera*, has represented the main problem for *Vitis vinifera* since its introduction in Europe, at the end of the 19th century, until French scientists proposed to use native American Vitis spp. as rootstocks to control this pest. Grafted, resistant

grapevines have solved the issue for decades, nevertheless, in the 80's leaf galling infestations appeared in Italy becoming more common and serious recently. Up to now, few studies have been carried out on the effects of leaf galling generations on grapevine growth and production. Since severe grapevine leaf infestations were recorded in Tuscany, a study was conducted in two vineyards in the Siena province in order to evaluate possible effects on grape production. The phylloxera infestation was monitored by sampling Sangiovese vines (*V. vinifera*) in summer 2017. Infested plants were divided into 3 different groups according to the infestation level and compared to uninfested vines. Grapes were sampled and addressed to technological and phenolic analyses. Although the weather has been very dry for the entire experiment, it has been possible to evidence a remarkable effect of the leaf infestation on grape quality. The phylloxera leaf galling incidence decreased as the temperatures increased. The photosynthetic rate and gas exchange decreased as the infestation level increased. Technological and phenolic analyses carried out on grapes highlighted a reduction of the grape quality. As a matter of fact, grapes from heavy infested vines showed reduced sugar and polyphenolic contents. These preliminary findings confirm the necessity to carry on further researches aimed at investigating the phylloxera population dynamics in order to define appropriate economic thresholds for applying control methods against this pest.

Keywords: *Grape phylloxera*, leaf galling infestation, Tuscany, photosynthetic rate, grape quality

PO091

DAMAGE ASSESSMENT OF SUNN PEST *EURYGASTER INTEGRICEPS*

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Agro-ecosystems of wheat and barley consist of biotic and abiotic factors which influence the crop production directly and indirectly. They are perpetually modified by mankind to increase the yield. Therefore, clear understanding of the mentioned factors and their interactions would be very important in quality and quantity conservation of an ecosystem fauna. Among the insect species in wheat and barley, Sunn pest, *Eurygaster integriceps* Put. (Het: Scutelleridae) is the most destructive biotic agent. The pest is an ancient problem in Iran and many countries in Pale-arctic region which damages to the crop quantitatively (feeding on leaves and stems by adults which results in partial or complete spiels whitening and low grain production) and qualitatively (direct feeding on grains by nymphs and decreasing baking property of flour made of the damaged grains). Therefore, wheat as a strategic crop is covered by insurance to ascertain farmers regarding the crop loss compensation. However, it has not been easy to estimate the amount of yield reduction in damaged fields especially in case of quality measurement. Having said that, a study was carried out in order to obtain a guideline for Sunn pest damage and crop loss assessment to be used by insurance experts. The EIL was considered a base for quantity and quality damage to the crop. According to the results, the quantity damage was determined as 332.8, 294.4, 255.4, 226.4 and 227.2 Kg/ha in Pishtaz, Mahdavi, Shahriyar, Zarin and Alvand wheat varieties, respectively. Similarly, the quality damage in the same varieties was measured as 20520000, 14130000, 7200000, 46620000 and 20520000 Ril/ha, respectively.

Keywords: Sunn pest, Wheat, Quantity and Quality damage

PO092

MANAGEMENT STRATEGIES TO REDUCE WIREWORM DAMAGE IN POTATOES

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The larvae of the click beetles (Coleoptera: Elateridae), wireworms, are identified as a major pest of potatoes and other vegetable crops worldwide. Over the past ten years, a steady increase in the population of an invasive species *Agriotes sputator* in Prince Edward Island (PEI), Canada, resulted in its spread into un-infested crop land. The use of pheromones was the main approach employed to trap adults, but mass trapping of male beetles to reduce the population has been unsuccessful. Our objective was to create a trap to attract both male and female beetles that could be used to reduce the population in an infested field. In 2015, a light trap (NELT™) was invented and tested. The trap consists of a solar powered spotlight, a 16oz glass as a pitfall trap, and a ¼ inch wire cage to prevent by-catch of larger insects such as carabid beetles. The traps were placed in two wireworm infested fields in PEI and collected every two days from May 14 – July 30. Collected beetles were counted and sexed. Results showed significantly higher numbers of female and male beetles in the light traps compared to the control. A total of 930 beetles (40% females and 60% males) were collected per trap. Further studies in 2016 and 2017 confirmed the NELT to be an efficient method to remove females from the population prior to egg laying. Evaluation of a mass trapping strategy coupled with crop rotation using buckwheat or brown mustard, which has been shown to reduce tuber damage by 85%, and the use of an insecticide during the potato phase is underway. Preliminary results show a reduction in wireworm population in infested fields using this strategy.

Keywords: Wireworms, NELT, trapping, crop rotation, potato, management

PO093

A NEW CHANCE IN THE CHESTNUT ORCHARD IPM: IDENTIFICATION OF ECOTYPES AND CHARACTERIZATION OF THEIR RESISTANCE TO *DRYOCOSMUS KURIPHILUS*

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The Asian Chestnut Gall Wasp (ACGW), *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae) is considered one of the most impactful invasive pest of *Castanea sativa* Mill. The management of ACGW is challenging and the control obtained through the introduction of the parasitoid *Torymus sinensis* Kamijo (Hymenoptera: Torymidae) needs a variable number of years to reach satisfying levels. The use of resistant cultivars could be an efficient and eco-friendly choice for implementing the parasitoid use. A recent study, carried out in Southern Italy, showed the presence of an ecotype expressing resistance against ACGW. Starting from the results of this study our activities were extended to several different ecotypes. Ecotypes were characterized through morphologic and genetic methodologies taking into account also the commercial aspects. The second step was the characterization of resistance carried out by observing ACGW preimaginal stages and the respective effects on trees. The percentage of bud infestation, the number of eggs into the buds, the number of larvae inside the buds and galls, the healthy leaves