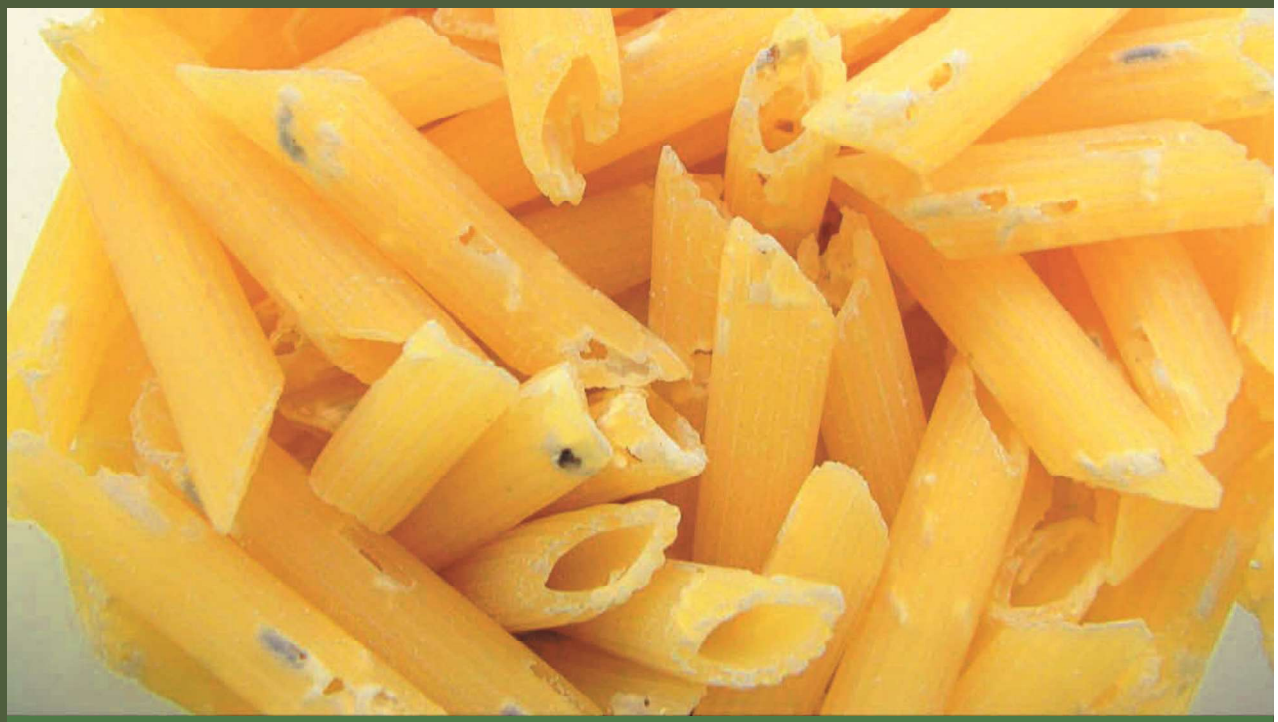
Vol. 173
2024



Working Group Integrated Protection of Stored Products (IPSP)

Preceedings of the 14th Meeting at Novi Sad (Serbia),

16–20 September, 2024

Edited by:
Jordi Riudavets, Sonja Gvozdenac,
Željko Milovac

IOBC-WPRS

IOBC-WPRS

The content of the contributions is in the responsibility of the authors.

The IOBC-WPRS Bulletin is published by the International Organization for Biological and Integrated Control of Noxious Animals and Plants, West Palearctic Regional Section (IOBC-WPRS).

Le Bulletin OILB-SROP est publié par l'Organisation Internationale de Lutte Biologique et Intégrée contre les Animaux et les Plantes Nuisibles, section Regionale Ouest Paléarctique (OILB-SROP).

The Publication Commission of the IOBC-WPRS:

Dr. Ute Koch
Schillerstrasse 13
69509 Moerlenbach, Germany
Tel +49-6209-1079
e-mail: u.koch_moerlenbach@t-online.de

Dr. Annette Herz
Julius Kühn-Institute (JKI)
Federal Research Center for Cultivated Plants Plant Protection in Fruit Crops and Viticulture
Schwabenheimer Str. 101
69221 Dossenheim, Germany
Tel +49 3946 474965
e-mail: Annette.Herz@julius-kuehn.de

Address General Secretariat:

Paula Baptista
Polytechnic Institute of Bragança
School of Agriculture
Campus de Santa Apolónia
5300-253 Bragança, Portugal
Phone: +351 273 303 332
e-mail: pbaptista@ipb.pt

ISBN 978-92-9067-360-6

Web: http://www.iobc-wprs.org

Committees

Liaison Officer:

Marc Bardin, INRAE-PACA, Montfavet, France

Convenor of the IPSP Working Group:

Jordi Riudavets (IRTA)

Local organizers:

Sonja Gvozdenac, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Željko Milovac, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Filip Franeta, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Ana Marjanović Jeromela, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Jelena Ovuka, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Vladimir Miklič, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Sandra Cvejić, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Aleksandra Ilić, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Brankica Babec, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Miloš Krstić, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Nemanja Ćuk, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Nada Grahovac, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Milica Škorić, Institute of Field and Vegetable Crops (IFVCNS), Serbia

Scientific Committee:

Sonja Gvozdenac, Institute of Field and Vegetable Crops (IFVCNS), Serbia
Jordi Riudavets, IRTA, Cabrils (Barcelona), Spain
Sara Savoldelli, University of Milan, Italy
Benjamin Fürstenau, Julius Kühn Institut, Berlin, Germany
Anita Liška, Faculty of Agrotechnical Sciences, Osjek, Croatia
Filip Vukajlović, University of Kragujevac, Faculty of Science, Serbia
Cornel Adler, Julius Kühn Institut, Berlin, Germany
Stanislav Trdan, University of Ljubljana, Slovenia
Vaclav Stejskal, Crop Research Institute, Prague, Czech Republic
Christos Athanassiou, University of Thessaly, Greece
Nuria Agustí, IRTA, Cabrils (Barcelona), Spain
Maria Otilia Carvalho, Universidade de Lisboa, Portugal
Goran Jokić, Institute of Pesticides and Environmental Protection, Serbia

Integrated Protection of Stored Products
IOBC-WPRS Bulletin Vol. 173, 2024
pp. 155-157

Can the choice of cultivar help prevent field and storage infestation of common bean with the bean weevil *(Acanthoscelides obtectus)*?

Snežana Tanasković[1], Miloš Marjanović[1], Nenad Pavlović[1], Aleksandra Ilić[2], Dušan Marković[1]
[1]University of Kragujevac, Faculty of agronomy in Čačak, Cara Dušana 34, Čačak, Serbia; [2]Institut of Field and Vegetable Crops, National Institute of the Republic of Serbia, Maksima Gorkog 30, 21000 NoviSad, Serbia
e-mail address: stanasko@kg.ac.rs

Extended abstract: The bean weevil *Acanthoscelides obtectus* (Say, 1831) (Coleoptera: Bruchinae) is economically the most important pest of common (French) bean (*Phaseoulus vulgaris* L.) in the open field and after harvest, during seed storage. In Serbia, common bean represents a traditionally recognized dish, so almost every small farmer cultivates this crop on certain area, especially in hilly parts of west Serbia, which are typical rural areas. In Serbia, in 2020, beans were grown on 8512 ha (Vasić et al., 2021). In marginal/rural area production, cultivation is organized on smaller areas without irrigation, and yield is satisfactory but only for family consumption (Savić et al., 2020; Marjanović et al., 2021; Gvozdenac et al., 2023). However, intensive bean production requires more resources and investments. Regardless on the production area, bean losses caused by the bean weevil are a major factor affecting seed availability and quality. Fumigation is a common pest management method used to control this pest. However, due to increasing demands for organic products, preventive and cultivation measures are gaining in importance. Among other, the choice of the most suitable, best performing and tolerant cultivar for each region is one of the most prosperous preventive measures that enable the creation of recommendations for farmers about a cultivar choice.

This work aimed to evaluate: i) how did the cultivar choice in two different sowing systems affect the bean weevil pods infestation in the field; ii) reliability and efficiency of yellow sticky traps as a visual attractant and entomological net in *A. obtectus* field monitoring and iii) ovipositional preference of *A. obtectus* after the harvest on stored seeds in "*No choice"* and "*Choice"* tests in laboratory.

Field experiment was set in split-plot design at locality Dragačevo (Gornja Kravarica, 422 m.a.s) during 2023. The experiment plot included bean cultivars Maksa and Inka as a single crop and in intercropping system common bean/maize. In both variants, single and intercropping, beans were sown in three different inter-row distances, and in three repetitions. Nine plots of common beans were formed in both cropping systems per cultivar. In total, there were 18 plots in the experiment in single and 18 plots in intercropping system. In both cropping systems, inter-row distances were at 70 cm, 35 cm and 55 cm. At inter-row distance of 55 cm, the distance between two rows of ribbon was 15 cm.

During vegetation yellow sticky traps were deployed so as to monitor for the occurrence and presence of *A. obtectus*, and entomological net used as a check for adult presence, from the beginning of flowering (BBCH 61) until the harvest (BBCH 99). After the harvest, pods were collected, air-dried and visually inspected for weevil damages. In the laboratory, seeds were examined for *A. obtectus* ovipositional and nutritional cultivar preference based on the number of ovipositional entries/scars. Stored common bean seeds were analyzed on near-infrared (NIR)

analyzer (PerkinElmer DA 7250™) to detect moisture, protein and fat content and detect differences in seed nutrients composition.

According to the obtained *in situ* results, yellow sticky traps were not a reliable diagnostic tool for bean weevil field monitoring. Zero score in entomological net indicated that the area was pest free. However, during pods visual inspection we detected ovipositional activity in terms of entrance holes on husks after the harvest. The inspection of harvested pods indicated that females laid eggs in the field only on Maksa cultivar. After the harvest, observation on Maksa seeds showed high level of damaged kernels (26.92 %), while no damages were detected on cultivar Inka.

So as to confirm cultivar tolerance/preference, laboratory "*No choice"* and "*Choice"* test were performed. The results indicate that both cultivars were suitable for pest oviposition, development and reproduction (average intensity of attack 4.07 imagoes per damaged kernel and up to 27.78 % infested seeds). However, no statistical differences in the number of infested kernels and holes per kernel were found between the cultivars. These results are opposite to the field trial results in which on Inka cultivar, no damages were detected.

At the moment, based on the open field trial results, we can speculate that difference in cultivar vegetation period and phenophases are the main reason for damage absence on cultivar Inka in the field. Therefore, recommendation to farmers in west Serbia, region Dragačevo (at high altitude, above 400 m a.s.) is to use cultivar Inka for sowing, and the seed of this cultivar could be stored safely. The absence of *A. obtectus* oviposition on Inka pods is an outcome of later flowering in comparison to cultivar Maksa, and this fact makes Inka kernels more tolerant in postharvest period. NIR results indicate that average protein amount significantly varied from 16.15 % (Maksa) to 21.59 % (Inka) and fat content from 1.29 % to 1.54 %, respectively. However, more detailed analysis is needed, such as coat thickness analysis, so at to determine all possible factors that affect different ovipositional preference in the field.

The average bean production of 1.1 t/ha (Statistical Office of Republic of Serbia, 2022), and the average consumption of beans 0.8 kg per capita represents a base for recommendation to farmers derived from our preliminary results. Sowing the Inka variety can provide a satisfactory yield of beans safe for storage after the harvest.

Key words: *Acanthoscelides obtectus,* common bean, cultivar Inka, cultivar Maksa, infestation

Acknowledgements

This research was funded by the Ministry of Science, Technological Developmentand Innovation of the Republic of Serbia, grant number:451-03-66/2024-03/200088 and by the Science Fund of the Republic of Serbia, #6691, New biorational methods for stored seed pest control and protection: To serve and prevent – SafeSeed.

References

Gvozdenac, S., Ilić, A., Vasić, M., Tanasković, S. and Prvulović, D. 2023. Suitability of three different legumes for *Acantoscelides obtectus* development and population growth. Journal of Central European Agriculture 24(2**)**: 455-463.
DOI: https://doi.org/10.5513/JCEA01/24.2.3826