



BOOK OF PROCEEDINGS

*XIII International Scientific Agriculture Symposium
"AGROSYM 2022"
October 6-9, 2022*



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PREFACE

Dear colleagues,

The Faculty of Agriculture of the University of East Sarajevo (Bosnia and Herzegovina), the Faculty of Agriculture of the University of Belgrade (Serbia), and CIHEAM - Mediterranean Agronomic Institute of Bari (CIHEAM Bari, Italy) organized from 6 to 9th October 2022 on Jahorina mountain (East Sarajevo, Bosnia and Herzegovina) the 13th International Scientific Agriculture Symposium “AGROSYM 2022”. The symposium was organized for the third time in a hybrid format, with in-person participation (around 300 participants) and online participation (400 participants), because of the prescribed restrictions caused by the COVID-19 pandemic and the world’s political situation.

AGROSYM 2022 made an important contribution to agriculture science and practice in different topics: plant production, plant protection, animal husbandry, environmental protection, organic farming, agroforestry, agroecology, and rural development. The Symposium topics cover all branches of agriculture as well as forestry and agroforestry. The scientific committee received around 700 papers and after review, it accepted 668 papers, 159 for oral presentations and 509 for poster presentations, which represents over 1500 authors from more than 80 countries worldwide.


During AGROSYM 2022, we had the opportunity to share the results of the current research at the international level and new information relating, inter alia, to biotechnology, world markets and agricultural knowledge and innovation systems in the European Union, especially in plenary papers. Based on many investigations, we can see that practices based on the concept of sustainable agriculture are gaining more and more attention. The goal for sustainable agriculture must be to meet society’s needs, not only the production of goods such as food and fiber but also the maintenance or restoration of ecosystem services such as watershed protection, healthy soil and the biodiversity on which humanity depends.

Big thanks to all members of the scientific committee and the staff from the symposium secretariat for their continued efforts and hard work that made this symposium possible and successful. I should like to thank my colleagues from the organizing committee, particularly the Dean of the Faculty of Agriculture of the University of East Sarajevo, professor Vesna Milic, as a host and chairperson. Special thanks to His Excellence, Prof. Sinisa Berjan, for all he has done to bring this event together; it has been a considerable logistical exercise.

Finally, I would like to thank all the authors, reviewers, session moderators and colleagues for their help in preparing and editing these e-Proceedings. Special thanks go to the organizers, partners and sponsors for their unselfish collaboration and comprehensive support.

Editor in Chief

East Sarajevo, 25 October 2022


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BIOPOTENTIAL OF INTRODUCED FALSE INDIGO AND ALBIZIA WEEVIL IN HOST PLANT CONTROL AND DURATION OF ITS DEVELOPMENT STAGES IN SOUTHERN REGIONS OF PANONIAN BASIN

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Abstract

The paper presents results of the entomological experimental studies of the biological, ecological and (bionomic) insect performances such as seasonal adaptation of introduced monophagous false indigo and albizzias weevil's *Acanthoscelides pallidipennis* Motschulsky. and *Bruchidius terrenus* (Sharp), Coleoptera: Chrysomelidae: Bruchinae, to phenological phases of aggressive invasive host plant *Amorpha fruticosa* L. on territory of Republic of Serbia with special attention on assessing and monitoring of new formed and detected inter species relations between autochthons parasite wasps from fauna (Hymenoptera: Chalcidoidea) and herbaceous seed weevil beetle. During 15 years (2006-2021) on approximately 30 localities data analyses were done for observed experimental host plants from samples with statistical significance. Status of genera from families Hymenoptera: Chalcidoidea.: Pteromalidae and Eulophidae after intensive investigations has been trophically identified. Recorded seed pest species of *A. fruticosa*, or *A. julibrissin* (Fabales: Fabaceae) was introduced in Serbia, and planted as ornamental trees, also were put undergo different kinds of laboratory and field research tests during this period in a goal of collecting data about lasting each of develop stage of their seed beetles. Field generations in different stages were also monitored by continuous infested seed collecting and its dissection. Established host plant-seed predator linkage was observed in correlation with different environment parameters, especially water level fluctuations in bank corridor formation stands and riparian cultures.

Keywords: *pods, Amorpha, Albizia, weevil, Chalcidoid wasp, herbivores, Serbia.*

Introduction

The genera *Bruchidius* (Coleoptera: Chrysomelidae: Bruchinae), which is described by Schilsky in 1905, is distributed in the old world and includes about 300 seedbeetle species (Hoebeke et al., 2009). Bruchine are economically important as pests of agricultural storage products; for example (Ebadollahi et al., 2013; Loni & Panahi, 2015). Larvae of *Bruchidius* species for host plants have leguminous plants, family (Fabaceae). *Amorpha fruticosa* and *Albizzia julibrissin* (Fabales: Fabaceae) was introduced in Serbia, and planted as ornamental trees (Vukićević, 1996, Jovanović, 2000). Duration of certain developmental stages of *Acanthoscelides pallidipennis* in laboratory conditions (in days) were measured by several methodologies (dissection, and one flacon one seed raising). During the research since 2012 in Serbia, the species *Bruchidius terrenus* (Sharp), which are parasitized by *A. julibrissin* seeds, and their parasitoids (Gagić-Serdar et al., 2012; Gagić-Serdar et al., 2013) had been recorded for the first time (Figure 1 and Figure 2.)

Materials and methods

The collected Populations (Figure 1) were cultivated under controlled conditions in order to obtain data on the length of each development stage. In addition to the development stages of seedbeetles, development stages of their parasitoids have also been recorded, which are further grown in plastic boxes with mesh and petri dish for the purpose of determination (Figure 9). The discovery of randomly selected pods revealed seed infestation according to Tuda's methodology and associates (2001). Parasitoids are determined by using interactive act keys like De Graham (1969); Trâpicéyn (1989); Medvedev (1978) & Bouček (1991) by prof. dr Ljubodrag Mihajlović.

Results and discussion

Since start of research many numbers of species of parasitic wasps had been determined and registered as autochthonous fauna; they were determined as the natural enemies of granivorous *Acanthoscelides pallidipennis* (Motschulsky) and *Bruchidius terrenus* (Sharp). Duration of certain developmental stages of *Acanthoscelides pallidipennis* in laboratory conditions (in days). The parasitoid complex consist primary of both are the *Dinarmus acutus* (Hymenoptera: Chalcidoidea: Pteromalidae) and an entirely new species of Eurytomidae (Hymenoptera: Chalcidoidea) (Figure 3-8). The adaptation process is still ongoing; parasitoids are indigenous species, trying even to be synchronous with development stages of Bruhinae. *D. acutus*, which is fed inside the pods, is fed in the larvae within the originally infested healthy generative material of the silk tree, and is considered to be solitary ectoparasitoid. Nevertheless, they were found by numerous species of Eulophidae (Hymenoptera: Chalcidoidea) as the base, as parasitoids of the second or third order-hyperparasitoids: Eulophid genera *Aprostocetus* and *Tetrastichus*. Nothing less important for the abundance of germination of seeds is also mentioned parasitoids that have about 15-20% of the total number of infested seeds. Information on the, biology, identity, phenology, distribution and impact of silk tree key parasitoid species in Serbia still need to be investigated in the future.



Figure 1. Beetle *Bruchidius terrenus* after eclosion, 2017, site Ruma (Original)



Figure 2. Darker appearance of the adult elitrae cover of *Bruchidius terrenus*, site Novi Sad, 2014. (Original)



Figure 3. parasitic, wasps fam. Eurytomidae (Hymenoptera: Chalcidoidea; Eurytomidae), by *Albizia* weevil (Original)



Figure 4. parasitic, wasps fam. Eurytomidae (Hymenoptera: Chalcidoidea; Eurytomidae), by *Albizia* weevil (Original)



Figure 5. Parasitic wasp family (Hymenoptera: Chalcidoidea: Eupelmidae), *Eupelmus vesicularis*, *Albizia*'s Weevil (Original)



Figure 6. Parasitic wasp family (Hymenoptera: Chalcidoidea: Eupelmidae), *Eupelmus vesicularis*, *Albizia*'s Weevil (Original)



Figure 7.
Parasitic wasps family Pteromalide,
Dinarmus acutus (Hymenoptera:
Chalcidoidea: Pteromalidae) *Albicija's*
weevil(Original)



Figure 8.
Parasitic wasps family Pteromalide,
Dinarmus acutus (Hymenoptera:
Chalcidoidea: Pteromalidae) *Albicija's*
weevil(Original)



Figure 9. Adults of *Bruchidius terrenus* *Albicija's*
weevil, flew out of the legume pods (seeds) of *Albizia jullibrisin* collected in Ruma
Deteline site, parasitoids, and details in appearance compared of adults and green pods
with damage and emerging wholes (Original)

Table 1. Duration of certain developmental stages of *Acanthoscelides pallidipennis* in laboratory conditions (in days)

Year of research	Egg stage	Larval stages	Pupa stage	Imago stage	Total life cycle duration
2007	11 - 14	25 - 33	7 - 9	15 - 26	58 - 72
2008	12 - 14	18 - 20	8 - 11	14 - 19	52 - 64
2009	10 - 15	15 - 19	8 - 15	12 - 17	45 - 61
2010	11 - 15	17 - 21	7 - 11	15 - 17	50 - 64
2011	10 - 14	20 - 22	8 - 14	12 - 14	50 - 64

Conclusions

Parasitoids that are shown and photographed in this paper, the first time were recorded and found as *Amorpha fruticosa* and *Albizia jullibrissin* weevil parasitoids and they are indigenous species that have adapted to non-native host (host plant as non-native seed beetle). Duration of certain developmental stages of *Acanthoscelides pallidipennis* in laboratory conditions (in days) were measured by several methodologies (dissection, and one flacon one seed raising). That's opens many questions about their bionomy and ecology which is in adaptive, denizen state.

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