

Seminiphagous Bruchidae (Coleoptera) on the *Amorpha fruticosa* L. shrub

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Rezumat

Bruchidele (Coleoptera: Bruchidae) seminifage ale arbustului *Amorpha fruticosa* L

Din păstăile de *Amorpha fruticosa* L. colectate între anii 1882-1995 din Grădina Botanică din București, Herculane, Valea Fânațelor-Cluj-Napoca și Grădina Botanică din Cluj-Napoca, am obținut insecte adulte din două specii de bruchide: *Acanthoscelides pallidipennis* (MOTSCH.) specie semnalată de noi pentru prima dată în România și pentru a doua oară în Europa și *Bruchidius seminarius* (L.) specie obținută de noi pentru prima dată din păstai semințe de *A. fruticosa* L.

La prima specie pe baza datelor obținute privind emergența adulților am conturat ciclul biologic. Specia are o generație în câmp și probabil cel puțin încă o generație în condiții de depozit (laborator). Am studiat stadiile de larvă, pupă și adult cât și comportamentul de dăunare al insectei asupra plantei gazdă.

Keywords / Cuvinte cheie: small acacia, seminiphagous Bruchidae

Amorpha fruticosa L. (small acacia) is a cultivated shrub in our country as a decorative plant. It is already widespread as a spontaneous plants, (SONEA 1979). In North America three Bruchidae species which have this shrub as host plant are known: *Acanthoscelides pallidipennis* (MOTSCHULSCHY 1874), *Acanthoscelides submuticus* (SHARP., 1885) and *Acanthoscelides floridae* (HORN., 1873), (JOHNSON, 1970). These three species are not known up-to-date in Romania (FLECK 1905, PETRI 1912, 1925, PANIN 1951). In Europa *A. submuticus* (SHARP.) and *A. floridae* (HORN.) are not known too (KALTENBACH 1874, PIC 1913, WINKLER 1927-1932, HOFFMANN 1945, LUKIANOVICI & TER-MINASEAN 1965, LABEYRIE 1966, KASZAB 1967, BRANDL 1981) and *A. pallidipennis* (MOTSCH.) has been found recently in Hungary and Southeast Europe (WENDT 1981).

Our first record was in the Botanical Garden in Bucharest (August, 1982), when we observed infested pods by Bruchidae on *Amorpha fruticosa* L..

Material and methods

Material was collected between 1982-1995 in Botanical Garden in Bucharest, Herculane-Caraș-Severin district, "Valea Fânațelor"-Cluj-Napoca and Botanical Garden in Cluj-Napoca.

Samples (approx. 500 pods/sample) were

collected each time in the ripping phenophase. They were kept in an incubator at about 20 °C. All the growing phases of the insects (larvae, pupa, adult) were observed. For outlining the biological cycle, the emergence period of the adults bred in laboratory were studied. The laboratory data were correlated with the field data. Simultaneously, it was estimated the frequency of the fit on pods and the percentage of the infested seeds.

Results and discussion

1. Identification of the Bruchidae species.

Two Coleoptera species, belonging to Bruchidae Family, were identified in the collected samples. The external morphology and the genitalia study allowed to identify as: *Acanthoscelides pallidipennis* (MOTSCHULSCHY 1874) and *Bruchidius seminarius* LINNÉ 1768 [= *B. pusillus* GERMAR 1824]. Almost all the specimens born in laboratory belonged to the first species (12484 specimens), the other species being present in a small number of specimens (17 specimens), (Tab.1 and Tab. 2).

From all the *Acanthoscelides* species, only two: *A. obtectus* (SAY.) and *A. mimose* F. are cited in Europe in the beginning of the 20th century. The others: *A. caliginosus* BAUDI., *A. andreae* HARTMANN, *A. tetricus* SCHY. and *A. tessellatus* KLUG. were recently imported in Europe at the same

time with the host plant (HOFFMANN 1945, BRANDL 1981).

In the United States of America 43 species of *Acanthoscelides* are described. Three of these species live on *Amorpha*: *A. submuticus* (SHARP.), *A. pallidipennis* (MOTSCH.) and *A. floridae* (HORN.) (JOHNSON 1970).

In conclusion we can affirm that this is the first record of the *A. pallidipennis* (MOTSCH.) species in Romania and the second record in Europe. The other species, *Bruchidius seminarius* L. is for the first time obtained by us from *Amorpha fruticosa* L. pods.

Because *Bruchidius seminarius* L. is very common in Europe (polyphagous on different spontaneous leguminous), it will be described only *A. pallidipennis* (MOTSCH.).

2. Description of the *Acanthoscelides pallidipennis* (MOTSCHULSCHY 1974), (= *collusus* FALL 1910)

[=*Bruchus collusus* FALL = *Bruchus perplexus* FALL = *Mylabris collusus* LENG. = *Mylabris perplexus* LENG. = *Acanthoscelides perplexus* JOHNSON], (JOHNSON 1970). It has a smaller size, between 1,1 and 2,7 mm. The males are smaller than the females and they have a darkish colour. The spines from the internal margin of the

hind femurs are smaller than the *A. obtectus* (SAY.). Hind tibia has only one longitudinal carinnae and has the apex with three usual spinules and an acuminate spine reaching to about one-fourth as long as first tarsomer. The first tarsomer has only one medial glabrous longitudinal carinnae. Head is black, the basal four (sometimes five) antennal segments are red-orange, the remainders are dark-brown to black. Pronotum, prosternum and procoxa are black. Pronotum has large dots and white-gray hairs. Elytron's colour varies from black to red-orange, narrow basal black margin. They have white, brown and golden hairs, grouped in longitudinal patches. The ventral part of the body is black with white to gray hairs; the pygidium is black, sometimes with orange shades, and with white or sometimes the yellow-white hairs.

Legs are usually red-orange, sometimes red-brown and sometime the bottom of femurae are black.

The larva: two larva instars exists- the first is the neonate larva and the second is apod eucephal larva (Fig. 1). This second instar was recorded in our stocked pods (Fig. 2). It results that the insect hibernates in this second instar.

The pupa: is free, characteristic for coleopterans (Fig. 1).

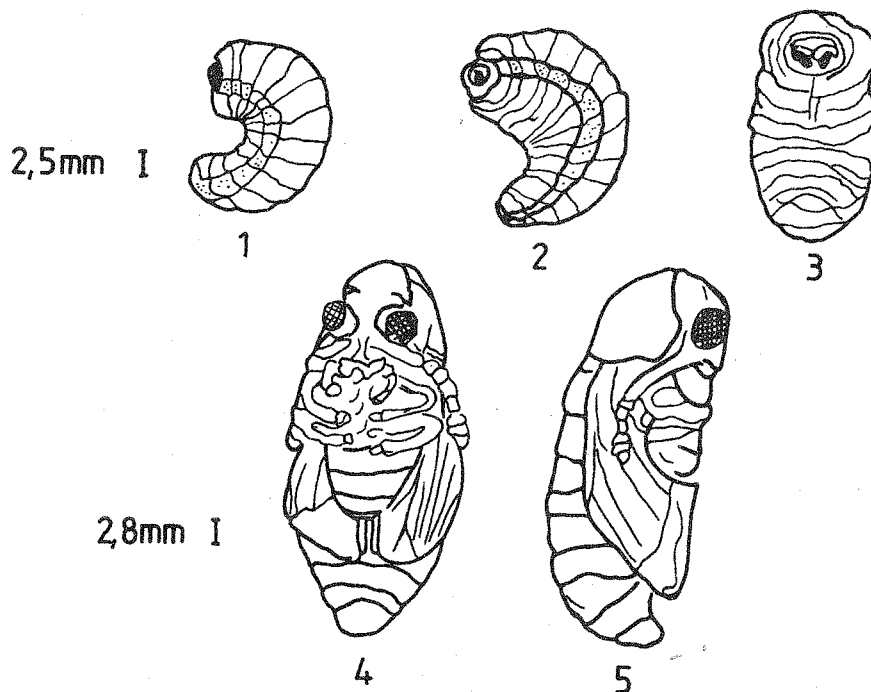


Fig. 1. *Acanthoscelides pallidipennis* (MOTSCH.): larva (1. 2. 3); pupa (4, 5).

2. Biological cycle of *Acanthoscelides pallidipennis* MOTSCH. 1974. The hibernating stadium is the complete developed larva, in seeds (pods). In spring, in April-May, the larva transforms in pupa and then in adult insect.

Table 1

Bruchidae from pods of *Amorpha fruticosa* L. (Botanical Garden-Bucharest)

Nr.	Species	Date when the samples were collected	Emergence of the adults		Frequency of the infested seeds %
			Date	Number	
1.	<i>Acanthoscelides pallidipennis</i> (MOTSCH.)	25.VIII.1982 (497 pods)	5.IV. 1.VI. 1983	310 114	85,31
		15.IX.1988 (746 pods)	28.IX.- 18.X. 1989	455	60,99
		27.X.1991. (5048 pods)	5.VI.- 20.VII. 1992	4449	88,13
		3.IX.1992 (1177 pods)	20.VI.- 28.VII. 1993	209	17,75
		1.X.1992 (922 pods)	20.VI. 28.VII. 27.X. 21.XI. 1993	161 92 42 67	39,26
		27.III.1994 (9911 pods)	19.VI. 1994	902	9,10
		5.II.1995 (646 pods)	1.V.- 28.VII. 1995	514	79,56
		15.IV.1995 (154 pods)	5.V. 1995 20.IX. 1995	77 7	54,54

Table 2
 Bruchidae from pods of *Amorpha fruticosa* L. (Herculane; Caraș-Severin county; "Valea Fânațelor": Cluj-Napoca and Botanical Garden-Cluj-Napoca)

Nr.	Species	Place and date when the samoles werw collected	Emergence of the adults		Frequency of the infested seeds %
			Date	Number	
1.	<i>Acanthoscelides pallidipennis</i> (MOTSCH.)	Herculane 30.VIII.1985 (6582 pods)	7.IV. 1986	5107	77,59
		"Valea Fânațelor", Cluj-Napoca 1.X.1992 (89 pods)	2.VI. 1993	62	81,81
2.	<i>Bruchidius seminarius</i> L.	Botanical Garden, Cluj-Napoca 25.XI.1992 (50 pods)	28.IV.- 20.VI. 1993	17	34,00

Adults from hibernating stadium fly in May-July. A second flight of adults, was observed in September (Fig. 3); that suggests the possibility of a second generation, in laboratory. This hypothesis must be verified in the next future by adequate research.

3. Host plants; harmful behavior. In the North-American continent, the species *A. pallidipennis* (MOTSCH.) occurs on *Amorpha* species: *A. californica* and *A. fruticosa* and on *Errazurizia rotundata*. It uses feed those species seeds. (JOHNSON 1970). In Romanian conditions, the insect was found only from pods (seeds) of *Amorpha fruticosa*.

The larvae develop in the infested seeds, feeding their contents; frequently parts of seed-lobes are not eaten. In one seed and respectively one pod, only one larva grows (Fig. 2). In the moment when the larva leaves the pod, it gnaws at the lateral seed-coat achieving a circular orifice of about 0,7-1,0 mm (Fig. 2).

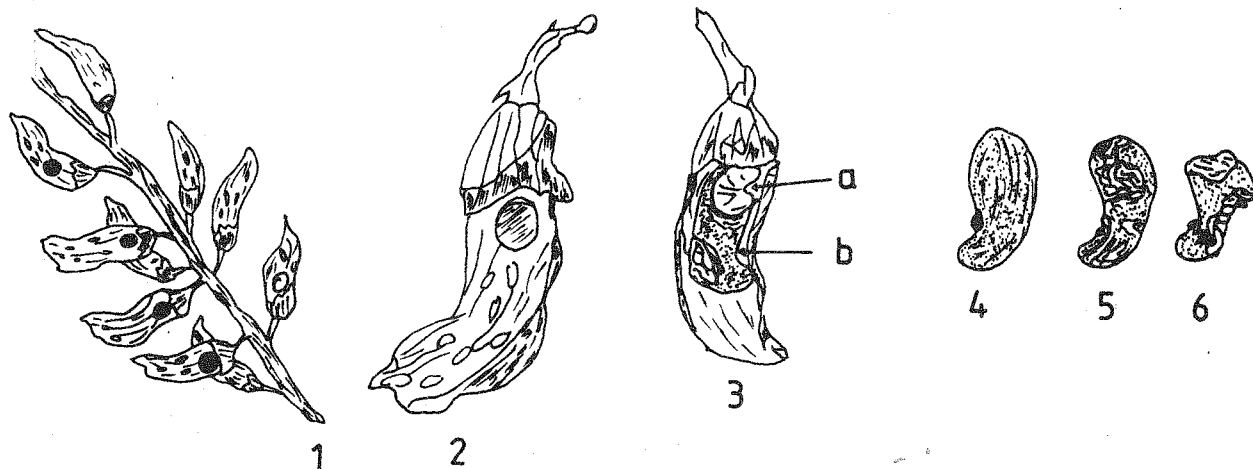


Fig. 2. *Acanthoscelides pallidipennis* (MOTSCH.) - harmful damage: 1, 2 - damaged pods; 3 - larva in the interior of pod (a-larva, b-damaged seed); 4 - healthy seed; 5, 6 - damaged seeds.

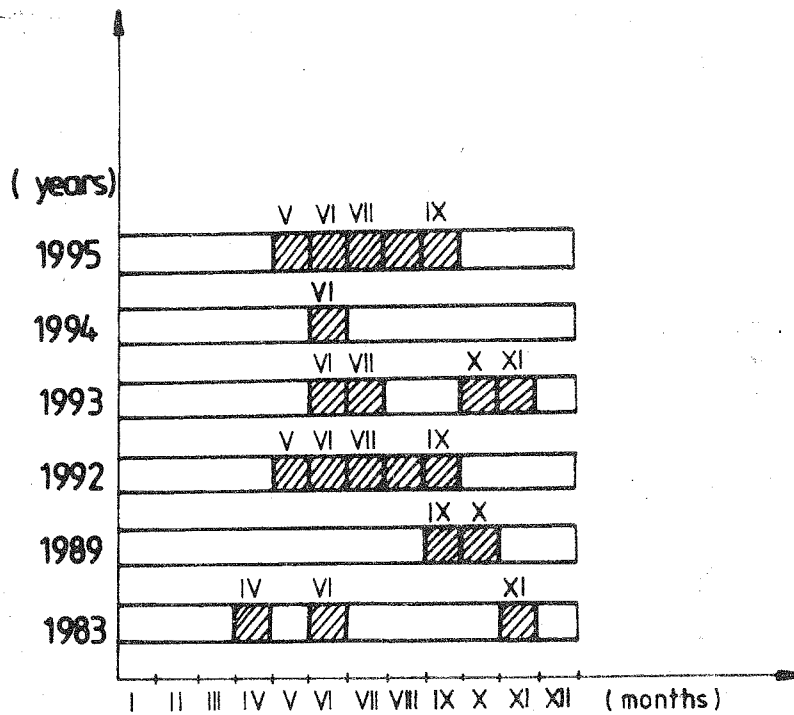


Fig. 3 *Acanthoscelides pallidipennis* - The emergence period of the adults in laboratory conditions. (samples collected from Botanical Garden - Bucharest).

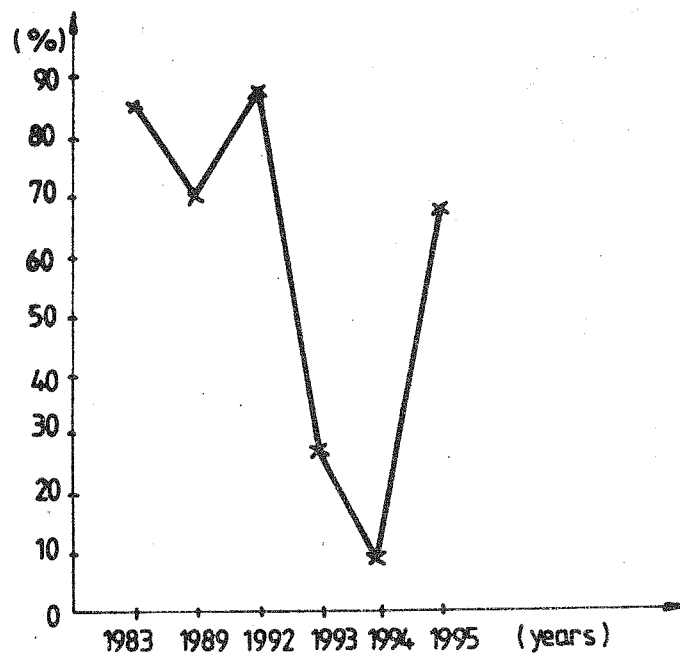


Fig. 4. *Acanthoscelides pallidipennis* - The frequency of attacked seeds (samples collected from Botanical Garden - Bucharest)

On the basis of samples analysis, respectively of the infested pods, it established the frequency of the attacked pods and seed: it varies between 9,10% and 88,13% (Tab. 1, Tab. 2 and Fig. 4).

Conclusions

Acanthoscelides pallidipennis (MOTSCH.) was first time indetified in Romania and second time in Europe, infesting the pods and respectively the seeds of the shrub *Amorpha fruticosa* L..

It was established the biological cycle, on the basis of the records of the appearance of insects from the pods and of the dissection of the infested seeds. The insect has a field generation and at least one in laboratory conditions; the hibernating phase is the larva in the infested pods.

The frequency of the pod and seed attacks was established to varying in Botanical Garden in Bucharest between 9,10% and 88,13%, was 77,59% in Herculane-Caraş-Severin district and 81,81% in "Valea Fânaşelor"-Cluj-Napoca.

The *Bruchidius seminarius* L. was first time recorded on the new host plant, respectively in the *Amorpha fruticosa* L. shrub seeds.

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