

LEGUMINOUS HOST-PLANTS FOR SEMINIPHAGOUS INSECTS (I)

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Abstract:

PERJU T.; MOLDOVAN I., 1980, Leguminous host-plants for seminiphagous insects, Not. Bot. Hort. Agrobot. Cluj, XI. 83-91. During the period from 1955 till 1980, thirty-eight seminiphagous insects were isolated from seeds of forty-two plant species pertaining to family Leguminosae.

Twenty-five species were Coleoptera (10 Bruchidae and 15 Curculionidae) six were Lepidoptera (Eupistidae, Tortricidae and Phycitidae) and seven were Hymenoptera (Eurytomidae). Most of the presented species, have been well known in the Romanian faunistic literature, and for a wide range of them comments were made on their economic significance.

Seminifagous insects found in some leguminous host species sparse or rare in Transylvanian flora may represent a limiting factor for the spreading of the host plants concerned.

Index words: Seminivorous insects, leguminous plants

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Works on this topics published in Romania and abroad deal particularly with pests of stored seeds: all the works, extensive or restricted, only concern the group of seminifagous insects collected on plants growing free, (37, 39, 41).

In the present work, as generally in the context of the agricultural entomology the term seminivorous concerns pests feeding first on seeds in field and then on stored seeds as well. Considering the large number of seminivorous species, particularly insects showing preference for a wide range of host plants, there have been only two ways for presenting them, in either a systematical order or on groups of host plants (Leguminosae, Cruciferae, Compositae). Having in mind the profile of the periodical "Notulae botanicae" we found more appropriate for presenting seminivorous species on groups of host plants.

Species of this family are largely distributed in Romania, and also in Transylvania. We may mention a wide range of species and of valuable forage plants belonging to the genera Trifolium, Medicago, Vicia, Astragalus, Lathyrus, Melilotus etc.

For practical reasons the data concerning the seminivorous insects living on various host plants are presented in an alphabetical order.

Material and method

The species presented were all obtained from pure cultures. In achieving it, ripe pod, raceme or head samples were taken and then stored in paper bags or bottles covered with gauze. After emerging from seeds and death in captivity the insects were counted and the frequency of attacks and lesions were estimated on their numerical basis.

Infested seeds and grains were sectioned in order to determine the sequence and the manner in which the lesions occurred. Drawings and photos are added showing the manner some species cause damages.

Results

1. Astragalus asper Wulf., A. cicer L., A. falcatus, A. glycyphyllos L., A. monspessulanus L., A. onobrychis L., are species frequently distributed and their seeds often eaten by larvae of bruchid seed beetles, by caterpillars of the genera Eupista and Grapholitha, and larvae of seminivorous wasps of the genus Bruchophagus.

- Bruchidius marginalis L. (Bruchidae, Coleoptera), occurs rarely, and was obtained from seeds of A. asper Wulf. collected from spontaneous flora in the surroundings of Cluj-Napoca,

on July 28, 1957 and July 14, 1958. Inside the seeds, larvae bite a loculus characteristic for Bruchidae and when they leave seeds, a rather long orifice may be seen in the tegument. The species has been well known in the Romanian fauna (35).

- Eupista spp. (Eupistidae, Lepidoptera). Larvae of this species bite host plant flowers and seeds at their full development and are attached to the pods by a silky, elongated, curved forrow. The larvae obtained from a material collected at Sincrai (Zalău) on August 23, 1978.

- Grapholitha compositella L. (Tortricidae-Lepidoptera) is scarcely seen, the caterpillars which feed on flowers and seeds of Astragalus onobrychis L. collected in the surroundings of Cluj-Napoca on July 14, 1958. Larvae damage the seeds in pods from the outside. This species is known as a component of the Romanian fauna (36) and as a damaging pest of red clover seed crops (10, 31).

- Bruchophagus astragali Fed. (Eurytomidae-Hymenoptera), is the most frequent seminivorous species widely distributed, sometimes the frequency of infested seeds amounting to 80-90 per cent. Larvae bite the inner side of seeds the tegument of which showing a small circular orifice when larvae disappear.

The beetle was first detected in the USSR (14, 15) and also reported in Romania (24, 27). It was isolated from pods collected in the area of Cluj-Napoca on July 12 and 17, 1957; July 14, 1958; June 10, 1961; July 13, 1974.

2. Colutea arborescens L. an ornamental bush encountered in parks and botanical gardens, is the favourite host plant of the seminivorous Bruchophagus coluteae Bék. (Eurytomidae-Hymenoptera). This pest was first recorded in Czechoslovakia (7), and reported in the fauna of Romania (11). Some samples were isolated from a material collected in the botanical garden of the Agronomy Institute Cluj-Napoca, in 1978. Larvae develop inside the seeds consuming them entirely; a small orifice is noticeable in the tegument at leaving the infested seeds.

3. Dorycnium herbaceum Vill., a plant widely distributed within the spontaneous flora of Transylvania, slightly damaged by seminivorous species. In Hungary, (13) was obtained the seminivorous Bruchophagus platypterus Wlk. from seeds of this plant. Within the material collected from different areas surrounding Cluj-N. and Zalău, the seeds were only infes-

ted with caterpillars of the species Grapholitha compositella L. (Tortricidae-Lepidoptera).

4. Galega officinalis L. owing to its seeds is the most common host of oligophagous weevil - Bruchidius varius Ol. and B. imbricornis Panz. (Bruchidae-Coleoptera). Bruchis seed beetles have been long known in the Romanian fauna (21, 35).

They were repeatedly collected from a biological material at the botanical garden of the Agronomy Institute Cluj-Napoca, on August 29, 1976, and August 28, 1978. Insects often infest 40-80 per cent of seeds, the damaged grains showing visible holes through which insects cut their way out.

5. Glycine hispida L. is the favourite host plant of leguminous -pod moth Etiella zinckenella Tr. (Pyralidae-Lepidoptera), an oligophagous species often seen damaging also the grains of other leguminous species as peas and particularly vetch.

6. Lathyrus spp.

6.1. Lathyrus sylvestris L. and L. tuberosus L. are the favourite host plants for clover seed weevil of genus Apion. Larvae of apionae F. (Curculionidae-Coleoptera) develop inside the seeds of these two plants. Insects attack seeds more often; larvae were observed in August. The species was obtained from a material collected on August 15, 1957 and on August 29, 1976.

6.2. Lathyrus tingitanus and L. odoratus L. are frequently infested by the caterpillars of the moth Etiella zinckenella Tr., which cut galleries in the cotyledons of damaged seeds where silky threads and faeces may be seen. Larvae were isolated in August 1979; plants cult. in Agrobotanic Garden.

7. Lotus corniculatus L. is a species favoured by seminivorous insects of the genera Apion, Grapholitha and Bruchophagus.

- Apion loti Kirby. (Curculionidae-Coleoptera), is a common species known in Romania as a faunistic component (4, 35) as well as a pest (21, 32, 34). It was repeatedly obtained from racemes with pods of L. corniculatus collected from various areas of Transylvania.

- Grapholitha compositella L. (Tortricidae-Lepidoptera) Caterpillars of this oligophagous species damage seeds of bird's foot trefoil; frequently seen in pods.

- Bruchophagus platypterus Wlk. (Eurytomidae-Hymenoptera) is the specific seminivorous pest of this plant, encountered in Europe (25) and in America (2). Spontaneous flora of bird's foot trefoil is severely damaged, the frequency of infested seeds exceed 40 to 50 per cent; cultivated L. corniculatus is generally less injured. The insect has been repeatedly isolated from L. corniculatus raceme collected in various areas of Transylvania.

8. Medicago sativa L., M. lupulina L. and M. falcata L. are favourite hosts of various seminivorous species; the most frequently seen were the Tychius spp., Bruchophagus spp., and Grapholitha spp.

- Tychius flavus Beck., T. medicaginis Bris., T. picirostris Fabr. (Curculionidae-Coleoptera), are lucerne seed weevils which often threaten seed crop yield of Medicago spp. Insects of all species were isolated from seed pods of cultivated and spontaneous lucerne. Some of the above mentioned species were recently investigated (40) and have been long established in the Romanian fauna (35).

- Bruchophagus roddi Guss. (Eurytomidae-Hymenoptera), the most widely distributed and the most detrimental seminivorous insect of lucerne seed crops of Romanian lowlands. Seed infestation level noticed in spontaneous flora was as high as 32 per cent while in seed crops it only attained 10 to 15 per cent (29). It was isolated from seeds of all lucerne species preferentially from M. sativa L.

- Grapholitha compositella L. (Tortricidae-Lepidoptera), oligophagous species occurring frequently in lucerne seed pods; caterpillars bite seed. It was isolated from a lot of pod samples collected from spontaneous flora and cultivated areas in Transylvania and in other regions of Romania as well.

9. Melilotus albus Medik. and M. officinalis Medik. are favourite hosts for seminivorous insects of the genera Tychius and Eupista.

- Tychius medicaginis Bres. and T. meliloti Steph. (Curculionidae-Coleoptera) are seed beetles, the larvae of which feed on seeds of both species of Melilotus. They were isolated from seeds collected in the surroundings of Cluj-Napoca on August 18, 1978; the incidence of this seed beetle is generally low.

- Eupista spp. (Eupistidae-Lepidoptera) is also a species

relatively seldom isolated from inflorescences of Helilotus spp. Butterflies of this species emerged in captivity from a biological material collected in the surroundings of Cluj-Napoca on August 18, 1978.

10. Onobrychis viciifolia Scop. is the preferred host plant of seminivorous insects belonging to the genera Bruchidius and Eurytoma.

- Bruchidius unicolor Oliv. (Bruchidae-Coleoptera) known as a faunistic component of the Romanian flora (4, 35), and as a damaging pest (27) as well. It most frequently occurs in seeds of spontaneous flora, yet it may be found in sainfoin seed crops as well.

- Eurytoma onobrychidis Nik. (Eurytomidae-Hymenoptera) a seminivorous insect frequently damaging sainfoin seed crops (20). This species was detected as a detrimental one in the Romanian fauna, attacking up to 10 per cent of the seed crops (27, 28).

11. Ononis spinosa L. and O. hyrcina Jack., are common leguminous plants in degraded grasslands, on sliding soils, the seeds of which being infested by seed beetle larvae of the genus Apion and wasps belonging to the genus Bruchophagus.

- Apion ononidis Mayr. (Curculionidae-Coleoptera). Larvae of this species develop in pods and bite seeds from outside. The species has been known long ago in Romania (35). It was isolated from a material collected in spontaneous flora on areas of Cluj and Zalău on July 23, 1976 and August 23, 1978.

- Bruchophagus (Eurytoma) ononis Mayr. (Eurytomidae-Hymenoptera) belongs to the most common species damaging severely host plant seeds. The insect was obtained from seeds of both Ononis species, collected from a spontaneous flora of Cluj-Napoca, in 1977 and 1978.

In the Romanian fauna it was detected on seeds of Sophora japonica L. (25).

12. Pisum sativum L. and P. arvense L. are plants the seeds of which are damaged by pea beetle larvae of the genera Bruchus, Tychius, Grapholitha and Etiella.

- Bruchus pisorum L. (Bruchidae-Coleoptera). One of the most common and most damaging insects causing severe losses in pea crops; owing to the density of insect populations, the chemical control is stressed (19).

- Tychius quinquepunctatus L. (Curculionidae-Coleoptera) a pea beetle rarely seen in Transylvania; in other regions of Romania it causes injuries in pea crops requiring an efficient control (5, 6). It was isolated from pea pods in the area of Cluj-Napoca in 1955.

- Grapholitha dorsana Fabr. (Tortricidae-Lepidoptera). Caterpillars of this species bite characteristically pea grains inside the pods, occasionally being injurious for pea crops (17). It was isolated from pea pods collected in the surroundings of Cluj.

- Etiella zinckenella Tr. (Pyralidae-Lepidoptera). Caterpillars of this moth were frequently seen damaging seeds of various leguminous species; sometimes heavily injuring pea and soybean crops (17, 18, 23, 30). It was only rarely seen in the surroundings of Cluj, damaging pea and vetch grains.

13. Phaseolus vulgaris L. represents the exclusive host plant for the common bean weevil - Acanthoscelides obtectus Say (38). Known as a quarantine pest in the Romanian fauna for bean crops and for stored bean as well, the insects are of a significant practical importance. Though a pest of stored pea grains, this weevil have been seen for years on bean crops in the areas of Cluj as well thus calling attention on the menace it represents to crops as well.

14. Sophora japonica L. is the favourite host plant of the seminivorous wasp Eurytoma (Bruchophagus) ononis Mar. (Eurytomidae-Hymenoptera). The insect has been frequently seen emerging from seeds of this tree, the infestation degree rising at 40 to 50 per cent. It was reported in the Romanian fauna (24).

15. Trifolium spp.

15.1. Trifolium pratense L., T. medium L., T. incarnatum L., T. alexandrinum L., T. fragiferum L., T. montanum L., T. pannonicum Jacq., T. rubens L. etc. are species more or less preferred by florivorous and seminivorous insects of the genera Bruchus, Apion, Tychius, Eupista, Grapholitha and Bruchophagus.

- Apion aestivum Germ., A. apricans Hrbst., A. assimile Kirby., and A. varipes Germ., (Curculionidae-Coleoptera), are the main apionid species ravaging red clover and partially the seeds. All these species together with some others less common, were collected in various parts of Romania, especially from

Transylvania, Banat, Crişana and northern Moldavia were repeatedly reported (9, 16, 22, 32, 34).

- Tyobius (Microtrogus) picirostris Sch. (Curculionidae-Coleoptera). A seminivorous species occurring at times in a large number, on heads of white and red clover crops and on spontaneous flora as well. It was reported in the Romanian fauna (32, 34).

- Eupista alcyonipenella Kalt., E.spissicoornis H., (Eupistidae-Lepidoptera). They are species currently infesting white and hybrid clover inflorescences, though other clover species, including red clover, have at times been damaged (1).

Insects of these species were repeatedly collected from heads of various clover species. The larvae bite flowers and seeds.

- Bruchophagus gibbus Boh. (Eurytomidae-Hymenoptera), is a common species the larvae of which develop inside the seeds of some clover species, especially of T.medium (24, 26). It sometimes causes significant damages in red clover crops (5 to 8 per cent of seed are spoiled) requiring measures of control.

- Grapholitha compositella L. (Tortricidae-Lepidoptera), a species known (1) as pest for clover crops. In the Romania fauna the species was reported (31) and described (10).

15.2. Trifolium repens L. and T.hybridum L. are host plants for clover seed weevil of the genera Bruchidius, Apion, Tychius and for caterpillars of Eupista.

- Bruchidius varius Oliv., B.imbricoornis Panz., B.geminarius L., B.bimaculatus Ol., and B.dispar Gull., (Bruchidae-Coleoptera). Weevil preferentially attack white and hybrid clover and they rarely have been detected on red clover in Romania; in France, the former is an important agricultural pest in red clover seed crops (3). Weevil of all three species were isolated from red, white and hybrid clover heads in various areas of Transylvania, especially in the neighbourhood of Cluj-Napoca, on August 28, 1972, July 21, 1976.

- Apion dichroum Bed. and A.nigritarse Kby. (Curculionidae-Coleoptera) damage flowers of the two clover species, the heads infestation level being the same as that of A.apricans Host. and A.aestivum Germ. in red clover. Especially the former is a common pest of white-clover seed crops.

- Tyobius picirostris Sch. (Curculionidae-Coleoptera)

a weevil currently feeding on white clover inflorescences, it was obtained from heads of spontaneous white clover.

- Eupista alcyonipenella Kalt. and E.spissicoornis H. (Eupistidae-Lepidoptera) currently damage the seeds in both host plants.

Prior to pupation, the larvae spin characteristic elongated silky cocoons settled on pods.

16. Vicia spp.

16.1. Vicia faba L. is the specific host plant for beetles of the genus Bruchus.

- Bruchus rufimanus Boh. and B.atomarius L. (Bruchidae-Coleoptera) beetle species known in Romania (39) attacking usually horse bean seeds at a rate up to 75 per cent in the subspecies major (35).

16.2. Vicia sativa L., V.cracca L., V.pannonica Cr., V.pissiformis L., V.dumetorum L. are host plants offering feeding basis for weevils larvae of the genera Bruchidius and Apion, and for moth of the leguminous plants of the genera Etiella and Grapholitha.

- Bruchus atomarius L. (Bruchidae-Coleoptera), a seminivorous found on Vicia cracca L. seeds collected in the district Braşov, on August 1, 1979.

- Apion pomonae F. (Curculionidae-Coleoptera), a weevil isolated from Vicia cracca L. seeds collected also in district Braşov on August 1, 1979.

- Etiella zinckenella Tr. (Pyralidae-Lepidoptera). Caterpillars of this oligivorous species frequently damage seeds inside the pods of Vicia cracca L. and V.dumetorum L. It was isolated from pods collected in Cluj on September 7, 1977.

- Grapholitha compositella L. (Tortricidae-Lepidoptera). Caterpillars of this Tortricidae eat seeds of Vicia species, they were detected especially on samples of V.pissiformis L. collected on August 28, 1977 and on August 23, 1977 from the Agrobotanical Garden Cluj-Napoca.

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