

THE THRIPS FAMILY AELOTHRIPIDAE (THYSANOPTERA: TEREBRANTIA) IN THE FARS PROVINCE

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(Received: February 13, 2000)

ABSTRACT

Nine species in four genera of family Aeolothripidae were collected in a survey of the fauna of Thysanoptera in Fars province. Of these, *Aeolothrips intermedius* Bagnall was widely distributed, while *Aeolothrips versicolor* Uzel, *Melanthrips rivnayi* Priesner, and *Rhipidothrips gratiosus* Uzel were found each in only one location. Four collected species, *Aeolothrips versicolor* Uzel, *Melanthrips rivnayi* Priesner, *M. separandus* Priesner, *Rhipidothrips gratiosus* Uzel and one genus, *Orothrips* Moulton, constituted new records for Iran. Notes on predation, the host plants and distribution are given. A key is provided for identifying the genera and species of Aeolothripidae. The method of preparing specimens for microscopic study is also included.

Key words: Aeolothripidae, Fars province, Thrips, Thysanoptera.

تحقیقات کشاورزی ایران

۲۰:۵۳-۶۶ (۱۳۸۰)

تریپس های خانواده Aeolothripidae

در استان فارس (Thysanoptera: Terebrantia)

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به ترتیب دانشجوی پیشین کارشناسی ارشد (اکنون مربی)، مربی و استاد فقید بخش گیاهپزشکی دانشکده کشاورزی دانشگاه شیراز، شیراز، جمهوری اسلامی ایران.

چکیده

در پژوهشی که روی فون تریپس های خانواده Aeolothripidae در استان فارس انجام شد، ۹ گونه در چهار جنس جمع آوری شدند. از بین آن ها گونه *Aeolothrips intermedius* Bagnall دارای پراکندگی زیادی بوده در حالی که *Melanthrips rivnayi* Priesner، *A. versicolor* Uzel، *Rhipidothrips gratiosus* Uzel هر کدام در یک مکان یافت شده اند. چهار گونه *Aeolothrips*، *Rhipidothrips*، *M. separandus* Priesner، *Melanthrips rivnayi* Priesner و *A. versicolor* Uzel در مورد شکارگری، میزبان های گیاهی و پراکنش این تریپس ها آورده شده است. کلید شناسایی جنس ها و گونه های Aeolothripidae و روش آماده کردن نمونه ها جهت مطالعه میکروسکوپی نیز ارائه شده است.

INTRODUCTION

Aeolothripids are medium sized thrips, about 2.5 mm long, usually with dark brown bodies (12). They comprise about 250 species in 26 genera (12,13). Most of the species feed on flowers, although some are predatory. Many species occur in the holarctic and a number in Australia, but the family is poorly represented in the wet tropics (13, 15).

Several hundred species of thrips are pests. Harmful species occur around the world in all latitudes between Finland and Alaska in the north (60° N) and New Zealand in the south (45° S). The damage they cause is often slight but sometimes severe, resulting in serious losses (6).

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Among the beneficial roles of thrips, pollination is probably the most important, particularly of crops such as oil palm (20). At least three species of Aeolothripidae, *Aeolothrips fasciatus*, *A. intermedius* and *A. tenuicornis* show pollen-feeding behavior (5). Also predacious species feed on other thrips, coccids, white flies, and mites (2). It is assumed that most Aeolothripidae, particularly in the subfamily Aeolothripinae, live as predators. It is believed that 80% of the 75 species of *Aeolothrips* are predacious (24). Mound (10) has also mentioned that *Aeolothrips* species commonly have an intermediate biology and many of them appear to be facultative predators, feeding on pollen as well as other arthropods.

According to Mound (L.A. Mound, personal communication) thrips fauna of southern Iran probably found a fauna that has species from India and Egypt. Zur Strassen also believes that Thysanopteran fauna of Iran contains elements mostly from the western oriental, eastern Ethiopian, and Mediterranean areas but it will also bear palearctic and even holarctic species as well as circum-subtropical ones. A further dozen species is still not identified. The belief is that many more than one hundred Thysanopteran species do occur in the whole country of Iran (R. zur Strassen, personal communication).

Very little is known about the Thysanoptera fauna of Iran. Particularly the information related to the species composition of thrips and their significance as potentially phytophagous or carnivorous is lacking.

The present study was conducted to identify the Aeolothripidae of Fars province, their predation, distribution and hosts; and to develop identification keys for the collected genera and species.

MATERIALS AND METHODS

In most cases for collecting aeolothripids vegetation and flowers were beaten over a small plastic tray. Then they were removed with a fine brush into collecting vials which contained a pencil written label of host plant, locality, date and any special notes. *Aeolothrips versicolor* was also collected by examining the leaves of ash tree infested by whitefly *Siphoninus*

phyllareae. For short period of preservation AGA, a mixture of 10 parts of 60% ethyl alcohol, 1 part of glycerin and 1 part of acetic acid was used. This kept the specimens relaxed and gently macerates the body contents.

The specimens were collected from some counties of Fars province between April 1998 and September 1999. Thysanopteran specimens were found thriving on plants any time of the year but usually most abundant between March and August.

In order to identify the species, it was essential to prepare a representative sample for detailed microscopic study. Specimens were macerated in cold 5-7 % NaOH to remove the body contents for 10 min to 4 hr depending on the condition of specimen. During that period, the abdomen between the hind coxae was punctured by a fine needle and gently massaged to expel most of the body contents. After maceration, the material was washed in 15% acetic acid for 5-10 min to neutralize the base and then it was transferred to distilled water. Again after 5-10 minutes the specimen was transferred to a droplet of chloral phenol placed in the center of a slide. After arranging the legs, antennae and wings with a fine needle, the chloral phenol was removed by a filter paper and the specimen was mounted on Hoyer's medium.

The slides were placed immediately on a hot plate at 50°C for about 2 hours, and then dried in an oven at 40°C for 3 weeks. In such case, the specimen would not shrink. The taxonomic approach adopted in this study was morphological. Figures of important taxonomic characters were made by using a drawing tube attached to a microscope.

RESULTS AND DISCUSSION

Up to now nine species in three genera of the family Aeolothripidae have been recorded from Iran (1, 4, 8, 9). The present study has revealed new records of *Aeolothrips versicolor* Uzel, *Melanthrips rivnayi* Priesner, *M. separandus* Priesner, *Orothrips priesneri* (Titschack) and *Rhipidothrips graciosus* Uzel from Fars province. Though Bhatti (3) classified *Melanthrips* in a separate family, Melanthripidae, a majority of specialists believe that

Melanthrips should be included in Aeolothripidae (11, 12, 13, 15, 23). We followed the latter in the presentation of this group. It seems likely that *Aeolothrips fasciatus* previously recorded by Mortazawiha (8) from northern part of Iran is also included in the materials collected from Fars province, but since the characters of this species especially in the female are sometimes confused with *A. intermedius* Bagnall, we have mentioned it with uncertainty.

General Characters of Aeolothripidae

Forewing in Aeolothripidae is broad with the apex rounded and usually with one or two transverse or longitudinal dark bands. Two longitudinal and three cross veins are present on the forewing. Their antennae have nine segments and the main antennal sensoria vary in different genera. The abdomen of female bears a broad and upcurved ovipositor. Abdominal tergite I of male is elongate with a pair of dorsal longitudinal ridges (12).

Antennae of larvae 7-segmented, segments III-VI divided by transverse grooves. Last antennal segment of larvae not prolonged in the form of a style. Legs of larvae long. Abdominal segment IX of 1st-instar larvae without denticles while in 2nd-instar 4 denticles are present (23).

Key to Genera of Aeolothripidae

1. Antennal segments III & IV each with two sensoria (Fig. 1)
.....2
- Antennal segments III & IV each with one sensorium.....3
2. Forewing pale, not broad, antennal segments VII-IX closely united.....*Rhipidothrips*
- Forewing broad with transverse dark bands; antennal segments VII-IX progressively shorter.....*Orothrips*

3. Head with at least 2 pairs of long setae behind the eyes; all antennal segments clearly differentiated; claw-like tooth not present on tarsal segment II.....*Melanthrips*
- Head without long setae behind the eyes; 3-5 last antennal segments fused; claw-like tooth present on tarsal segment II.....*Aeolothrips*

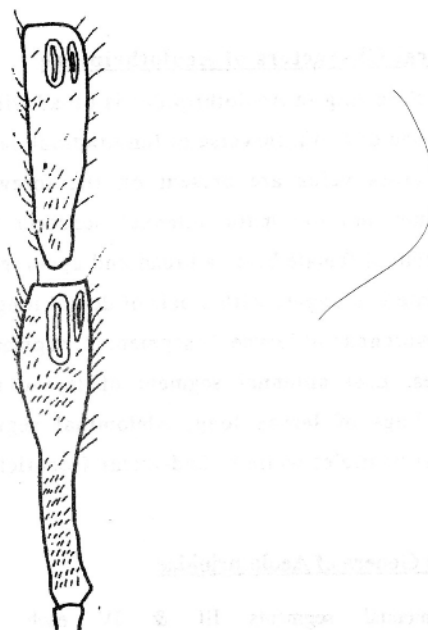


Fig. 1. *Orothrips priesneri* antennal segments III & IV.

***Aeolothrips* Haliday, 1836**

Head about as long as broad; sensoria on antennal segments III and IV linear; segments VI-IX short and condensed into one unit; maxillary palps 3-segmented; labial palps 4-segmented; head and pronotum without long setae; median abdominal sternites without discal setae (accessory setae); abdominal tergum I in male with 2 sclerotized, posteriorly diverging, narrow stripes.

The genus *Aeolothrips* comprises about 100 species worldwide (10, 11).

Key to Species of *Aeolothrips*

1. Prothorax pale yellow, often with a dark median spot; middle and hind tibiae dark; sense area on third antennal segment not reaching middle of segment
.....*collaris*
- Prothorax dark or brown, but if yellow, then middle and hind tibiae are also yellow2
2. Ring vein around apex of forewing darker than the membrane it surrounds, usually as dark as the veins in the transverse dark bands.....
.....*tenuicornis*
- Ring vein around apex of forewing as pale as the membrane it surrounds, much paler than the veins in the transverse dark bands 3
3. Posterior margin of forewing dark except at base and apex; forewing with 2 transverse dark bands.....*versicolor*
- Posterior margin of forewing pale medially between two dark cross bands; tergite IX in male with paired claspers but without curved setae (Fig. 2).....*intermedius*

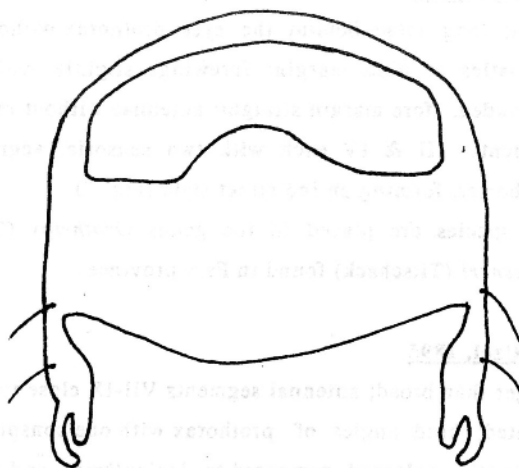


Fig. 2. *Aeolothrips intermedius* tergite IX.

Melanthrips Haliday, 1836

Body dark; wing pale, fuscous, or banded; antennae 9 segmented, segments III-IV with 1 narrow transverse circum-polar sensorium; head and pronotum with several pairs of long setae; maxillary palps 3-segmented; abdominal segment I of male very long. Sternites with discal setae; sternite VII with a pair of postero-marginal lobes.

Currently 38 species recognized in this genus (11).

Key to Species of Melanthrips

1. Forewings hyaline with two large dark cross-bars; antennal segments II & III pale; sensory area of segment IV somewhat reniform.....*rivnayi*
- Forewings uniformly grayish, or pale at base, not banded.....2
2. Pronotum with 4 or 5 pairs of posteromarginal setae.....*separandus*
- Pronotum with 6 or 7 pairs of posteromarginal setae.....*fuscus*

Orothrips Moulton, 1907

Head without long setae behind the eyes; prothorax without a series of conspicuous bristles at hind margin; forewings slightly widened towards apex, wings banded, fore margin straight; antennae without raised bristles, antennal segments III & IV each with two sensoria, segments VII-IX progressively shorter, forming an indistinct style (Fig. 3).

Three species are placed in the genus *Orothrips* (7). Only one species, *O. priesneri* (Titschack) found in Fars province.

Rhipidothrips Uzel, 1895

Head longer than broad; antennal segments VII-IX close together; labial palp 4-segmented; hind angles of prothorax with one conspicuous bristle; fore femora greatly enlarged compared to *Melanthrips* and with less well developed veins; abdominal segment IX of male with a tubercle on each side.

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Seven species are placed in this genus (11). Only one species, *R. graciosus* Uzel found in Fars province.



Fig. 3. *Orothrips priesneri* antenna.

Predation, Distribution and Host Plants

Relatively a few early entomologists specialized in studying thrips. This is perhaps so because many species can only be found by diligent searching and specimens need careful preparation and mounting.

One of the greatest weaknesses in our understanding about Aeolothripidae is the lack of studies on their biology and predatory habits. Adult thrips disperse readily and land on many plants that may not be their true hosts. Studies on the breeding host plants and feeding habits seems to be necessary even for the most common thrips species. Four of the species reported in this research, *Aeolothrips collaris* Priesner, *A. intermedius* Bagnall, *A. tenuicornis* Bagnall and *A. versicolor* Uzel were known as predators (16, 17). However, Pitkin (16) believed that *Aeolothrips*

intermedius Bagnall was a flower living species, while Shojai (19) reported this species as the predator of the aphid *Chaitophorus populi*.

Among the species of Aeolothripidae collected from Fars province, *Aeolothrips intermedius* Bagnall was found on many plants. This species has been also recorded from various regions of Iran (1, 4, 9, 19) and neighboring countries (18, 21, 22, 23). The species *Aeolothrips versicolor* Uzel, *Melanthrips rivnayi* Priesner and *Rhipidothrips gratiosus* Uzel which constitute new records in this work for Iran were extremely rare and each collected only on one host plant species.

Aeolothrips collaris Priesner

Material examined: Badjgah, 2 males, 4 females, *Elaeagnus angustifolia* L., 1810 m, 14. V. 1999- Beyza, 2 males, 3 females, *Triticum aestivum* L., 1550 m, 29. IV. 1999- Chehelcheshmeh, 2 males, 2 females, *Medicago sativa* L., 1900 m, 3. VIII. 1998- Eram, 5 females, 3 males, *Wisteria sinensis* (Sims.), 1540 m, 18. V. 1999- Kavar, 1 male, 3 females, *Zea mays* L. 1700 m, 17. VIII. 1998- Khanzenian, 3 females, *Cardaria draba* (L.), 2000 m, 23. IV. 1999- Marvdasht, 1 male, 3 females, *Medicago sativa* L., 1600 m, 5. VII. 1998.

Aeolothrips intermedius

Material examined: Badjgah, 3 males, 12 females, *Elaeagnus angustifolia* L., 1810 m, 14.V.1999; 13 males, 35 females, *Medicago sativa* L., 4. VII. 1999; 1 female, *Spiraea* sp., 3. V. 1998; 7 males, 21 females, *Cardaria draba* (L.) 6. IV. 1999; 2 males, 5 females, *Myrtus communis* L., 30. IX. 1999; 1 female, 22. IV. 1998- Bamu, 1 male, 2 females, *Astragalus* sp., 1830, 28. IV. 1999- Dashtarzhan, 11 females, *Medicago sativa* L., 2050m, 23. IV. 1999- Eram, 2 females, *Rosa* sp., 1540 m, 8. V. 1999- Fassa, 3 females, *Triticum aestivum* L., 1200 m, 22. IV. 1998- Kavar, 2 females, *Beta vulgaris* L., 1700 m, 17. VIII. 1998; 6 males, 25 females, *Brassica oleraceae* L., 24. IV. 1999- Khanzenian 8 males, 10 females, *Cardaria draba* (L.), 2000 m, 23. IV. 1999- Maharlu, 2 females, *Hordeum vulgare* L., 1500 m, 20. IV. 1999- Marvdasht, 4 males, 17 females, *Beta vulgaris* L., 1710 m, 5. VII.

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1998; 1 male, 4 females, *Zea mays* L., 4. VII. 1998; 2 males, 5 females, *Medicago sativa* L., 5. VII. 1998; *Peganum harmala* L. 5., VII. 1998- Nourabad, 1 male, 6 females, *Medicago sativa* L., 1100 m, 27. VI. 1998.

Aeolothrips tenuicornis Bagnall

Material examined: Bamu, 1 male, 3 females, *Crataegus* sp., 1720 m, 28. IV. 1999- Khanzenian, 2 males, 3 females, *Cardaria draba* (L.), 2000 m, 23. IV. 1999- Marvdasht, 1 male, 3 females, *Persica vulgaris* Mill., 1510 m, 13. IV. 1999- Nourabad, 2 females, *Astragalus* sp., 1150 m, 6. IV. 1999.

Aeolothrips versicolor Uzel

Material examined: Badjgah, 1 female, *Fraxinus rotundifolia* Miller, 1810m, 30. VI. 1998.

Melanthrips fuscus (Sulzer)

Material examined: Badjgah, 15 females, *Cardaria draba* (L.), 1810 m, 6. IV. 1998- Fassa, 2 females, *Triticum aestivum* L., 1200 m, 22. IV. 1998- Maharlu, 2 females, *Solanum tuberosum* L., 1410 m, 20. IV. 1999- Marvdasht, 4 males, 55 females, *Sinapis arvensis* L., 1600 m, 15. IV. 1999; 4 females, *Triticum aestivum*, 13. IV. 1999- Shiraz, 3 males, 12 females, *Rhaphanus* sp., 1650, 17. IV. 1999; 5 females, *Cheiranthus cheiri* L., 1600, 17. IV. 1999.

Melanthrips rivnayi Priesner

Material examined: Dashtarzhan, 1 male, 4 females, *Amygdalus scoparia* Spach, 1900 m, 23. IV. 1999.

Melanthrips separandus Priesner

Material examined: Badjgah, 5 females, *Taraxacum* sp. 1810 m, 7. IV. 1999- Eram, 1 male, 7 females, *Dianthus barbatus* L., 1540 m, 17. IV. 1999.

Orothrips priesneri (Titschack)

Material examined: Bamu, 13 females, *Crataegus* sp., 1720 m, 28. IV. 1999- Badjgah, 8 females, *Crataegus* sp., 1810 m, 1. V. 1998- Eram, 6 females, *Crataegus* sp., 1540 m, 28. IV. 1999.

Rhipidothrips gratiosus Uzel

Material examined: Beyza, 2 females, *Triticum aestivum* L., 1550 m, 29. IV. 1999.

ACKNOWLEDGEMENTS

The authors wish to thank Dr. R. zur Strassen, from Forschungsinstitut Senckenberg, Frankfurt A.M., for confirming identity of the specimens and his useful comments. Appreciation is due to Prof. L.A. Mound from CSIRO for his sincere academic cooperation in improvement of this study. We are also grateful to Prof. K. Izadpanah, Plant Protection Department, Shiraz University, for critical reading of the manuscript.

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