

BIODIVERSITY OF THYSANOPTERA IN THE SISTAN REGION OF IRAN

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ABSTRACT: The *Thrips* (Thysanoptera) fauna of Sistan region, Iran, was studied during (2009-2010). A total of 17 species representing 8 genera belonging to 3 families were collected and identified. *Aeolothrips eremicola* Priesner, 1938 is a new record for Iran fauna. In *A. eremicola* middle and hind tibiae are white at tips. Cross-bands of fore wings are narrowly united at posterior margin of fore wings. In male, abdominal segment IX without claspers. For the fauna of Iran, locality and date of collection, host(s) and distribution data for each species are provided.

KEY WORDS: Sistan, Iran, Fauna, *Thrips*, Thysanoptera.

Southeastern Asia is one of the most biologically diverse parts of the world, and agricultural production in this area is affected by a wide diversity of pest insects. Despite this, identification literature and general overviews of particular insect groups are surprisingly absent from this region, and this is particularly true of the order Thysanoptera (Reyes, 1994). Sistan and Baluchestan province is the largest province and located in south of Iran, bordering Pakistan and Afghanistan. This province comprise two sections, Sistan in the north and Baluchestan in south. More than 6000 recognised species in the insect order Thysanoptera (Mound, 2011). The traditional classification of the Order Thysanoptera is adopted, recognising nine Families for living species (plus three fossil families), with two subfamilies in the Phlaeothripidae (the only Family in suborder Tubulifera), and four subfamilies in the Thripidae (one of eight Families comprising suborder Terebrantia) (Mound, 2008). The thrips in Iran has been a subject of special investigations only in the last few years. There are 177 nominal species of Thysanoptera reported in Iran, including 132 species of Terebrantia in 47/49 genera, and 45 species of Tubulifera in 15 genera (Bhatti et al., 2009).

MATERIALS AND METHODS

In order to study of biodiversity of Thysanoptera in Sistan region some specimens randomly in different areas of the province during November to June 2007-2009 were collected. Two general techniques were used for collecting thrips: 1- individuals occurring on stages before start of shooting were directly collected on the leaves, 2-beating leaves, sheaths and spikes was used for subsequent stages. Different cultivated plants were beaten over a small white plastic tray. From the tray surface, the specimens were removed with a fine brush. Collected thrips were kept in plastic 1.5 ml Eppendorf tubes in AGA solution, a mixture of ten parts of 60% ethyl alcohol, one part of glycerine and one part of acetic acid. This mixture helps to distend the body of most thrips and keeps the limbs supple. Stored specimens were transferred to 60% alcohol and kept in the dark at the temperature

about 0°C to prevent loss of colour (Palmer et al., 1989). Most of collected adult thrips were mounted on microscope slides using Hoyer's medium.

RESULT AND DISCUSSION

Further research on the distribution of Thysanoptera in Iran should be carried out, because of various geographical region and vegetable zone in Iran, the number of species probably will increase in the future. With attention to the prior papers and 1 new records of this paper, the total number of Iranian thrips reaches to 186 species. In order to study of biodiversity of Thysanoptera in Sistan region during 2007 some specimens were collected. A total of 17 species belonging to 3 families and 8 genera were determined. Among them *Aeolothrips eremicola* Priesner 1938 is new record for Iran fauna. In *A. eremicola* middle and hind tibiae are white at tips. Cross-bands of fore wings are narrowly united at posterior margin of fore wings. In male, abdominal segment IX without claspers. In this survey species *Aeolothrips eremicola* Priesner, *Aeolothrips mongolicus* Pelikan, *Ataliothrips reuteri* (Bagnall), *Haplothrips aculeatus* (Fabricius), *Haplothrips eragrostidis* Priesner, *Haplothrips reuteri* (Karny), *Haplothrips tritici* (Kurdjumov), *Anaphothrips sudanensis* Trybom, *Chirothrips manicatus* (Haliday), *Eremiothrips efflatouni* (Priesner), *Eremiothrips similis* Bhatti, *Eremiothrips zurstrasseni* Bhatti, Bagheri & Ramezani, *Frankliniella occidentalis* (Pergande), *Thrips atratus* Haliday, *Thrips meridionalis* (Priesner), *Thrips tabaci* Lindeman, *Scirtothrips mangiferae* Priesner collected.

Suborder Terebrantia

Family Aeolothripidae

Aeolothrips eremicola Priesner, 1938

Material examined: Pole-nahr-ab, 33m, 9 ♀ on Wheat, 13. IV. 2010.

Hosts: Poaceae.

Distribution: New record for Iran fauna.

Aeolothrips mongolicus Pelikan, 1985

Material examined: Sad-e-Sistan, 9m, 1♀ on Alfalfa, 14. VIII. 2009.

Hosts: *Saxaul* sp., *Nitraria* sp., *Tamarix* sp. (Alavi et al., 2007).

Distribution: Eastern Palaearctic. Iranian records: reported for first time from Golestan Province by (Cheraghian & Hojat, 1998), Golestan Province (Alavi 2004; Alavi et al., 2007), Khorasan-e-Shomali province (Alavi & Kamali, 2003) (Alavi et al., 2007), Fars province (Fallah zadeh et al., 2011).

Family Thripidae

Anaphothrips sudanensis Trybom, 1911

Material examined: Banmak: 12m, 2 ♀ on Bean, 8. VII. 2010.

Hosts: Poaceae.

Distribution: Semi-Cosmopolitan. Iranian records: reported For first time From Golestan Province by (Cheraghian & Hojat, 1998), Khorasan-e-Shomali Province (Alavi & Kamali, 2003), Fars Province (Minaei & Alich, 2000a; Minaei et al., 2002), Golestan Province (Gilasian et al., 2000; Alavi & zur Strassen, 2002; Alavi et al., 2007), Kerman Province (Kheyrandish Koshkoei et al., 2000a; Teraz & Kheyrandish Koshkoei, 2002), Khuzestan Province (Behdad, 1996; Cheraghian & Hojat, 1998; Bagheri et al., 2005a; Alavi et al., 2007).

Chirothrips africanus Priesner, 1932

Material examined: Pole-nahr-ab, 33m, 1♀ on wheat, 13. IV. 2010.

Hosts: Poaceae.

Distribution: Indo-Mediterranean, North Afraca. Iranian records: This species was reported as new record for Iran by Alavi (2000) from Golestan Province. Golestan Province (Alavi et al., 2007).

***Chirothrips manicatus* (Haliday, 1836)**

Material examined: Zabol university, 17m, 1♀ on Wheat, 16. III. 2010. Pole-nahr-ab, 33m, 1♀ on wheat; 1♀ on barely, 13 IV. 2010.

Hosts: Poaceae.

Distribution: Semi-Cosmopolitan. Iranian record: this species was reported as new for the fauna of Iran by (Alavi & Kamali, 1995) from Bojnourd (now in Khorasan-e-Shomali Province; Alavi & Kamali, 2003). Kerman Province (Kheyrandish Koshkoei et al., 2000a; Teraz & Kheyrandish Koshkoei 2002), Khuzestan Province (Cheraghian, 1996; Cheraghian & Hojat, 1998; Bagheri et al., 2005a), Yazd Province (Mohaghegh & Kheyrandish Koshkoei, 2002; Alavi et al., 2007).

***Eremiothrips efflatouni* (Priesner, 1964)**

Material examined: Pole-nahr-ab: 33m, 4♀ on Barley, 13. IV. 2010.

Hosts: Chenopodiaceae (zur Strassen et al., 2003).

Distribution: Egypt, Canary Islandz, Israel, Iran (Bhatti et al., 2003).

***Eremiothrips similis* Bhatti, 1988**

Material examined: pole-nahr-ab, 33m, 1♀ on wheat, 13. IV. 2010, 1♀ On Barley, 13. IV. 2010.

Hosts: Poaceae

Distribution: Iraq (Bhatti et al., 2003), reported first time in Khuzestan Province (Ramezani et al., 2009).

***Eremiothrips zurstrasseni* Bhatti, Bagheri & Ramezani, 2009**

Material examined: Mianangi: 17m, 1♀+2♂ On Melon, 7. VIII. 2010.

Hosts: Poaceae

Distribution: Reported first time from Khuzestan Province by (Bhatti et al., 2009).

***Frankliniella occidentalis* (Pergande, 1895)**

Material examined: Zabol: 14m, 1♀ On Turnip; 2♀ On Common Plantain; 1♀ On Curely dock; 1♀ on Camels thorn, 1♀ On Clove, 22. IV. 2011.

Hosts: Western flower thrips have a board host range of more than 500 species in 50 plant families and are associated with many cultivated crops and ornamentals.

Distribution: Native to North America, The western flower thrips is widespread from sea Level to sub-alpine altitudes. It is the most common thrips species of California (Bryan & smith, 1989) and Arizona (Bibby, 1958). Iranian record: Reported first time from Tehran & Mahallat (Jalili Moghadam & Azmayesh Fard, 2004), Khuzestan province (Alavi & Behnamfar, 2005; Bhatti et al., 2009).

***Scirtothrips mangiferae* Priesner, 1932**

Material examined: Pole-Nahr-Ab, 33m, 1♀ On Wheat, 13. IV. 2010.

Hosts: *Citrus*, *Ficus*, *Caria*, *Mango*, *Myrtus communis*, *Vitis vinifera* (zur Strassen et al. 2003).

Distribution: Iran, Yemen, Sudden, Gabun (zur Strassen et al., 2003), In Iran reported from: Fars Province (Minae & Alich, 2000b), Esfahan Province (Etebari, 2002), Khuzestan Province (Bagheri et al. 2002), Khuzestan Province (Alavi & Behnamfar, 2005; Bhatti et al., 2009).

***Thrips atratus* Haliday, 1836**

Material examined: Zabol university, 17m, 3♀ On Wheat, 16. III. 2010.

Hosts: On flower of many plants particularly Caryophyllaceae (Mound et al., 1976).

Distribution: Europe and Britain (Mound et al., 1976). Iranian record: Reported first time from Gorgen Province by (Gilasian et al., 2000), Province Kermanshah (Mohaghegh & Kheyrandish Koshkoei, 2002), Tehran Province (Jalili & Azmayesh fard, 2004).

***Thrips meridionalis* (Priesner, 1926)**

Material examined: Zabol university, 17m, 2♀ On Wheat, 16. III. 2010.

Hosts: On a wide range of plant species including deciduous trees and shrubs.

Distribution: Mediterranean, Caucasia, Central Asia. Iranian records: *T. meridionalis* was first reported from Iran by Priesner (1954) who recorded the species from Shiraz mountains (Fars Province) based on six females collected on flowers of Prangosferulaceae (L.). Fars Province (Minae & Alich, 2000a; Minae, 2002; Minae et al., 2002; Alememansour & Fallahzadeh, 2004), Golestan Province (Mortazawiha & Dern, 1997; Gilasian et al., 2000), Kerman Province (Kheyrandish Koshkoei et al., 2000a; Teraz & Kheyrandish Koshkoei,

2002), Khorasan-e-shomali Province (Alavi & Kamali, 2003), Khuzestan Province (Cheraghian & Hojat, 1998), Lorestan Province (Jafari & Fallahzadeh, 2004), Tehran Province (Mortazawiha & Dern, 1977; Jalili Moghadam & Azmayesh Fard, 2004), Yazd Province (Mohaghegh & Kheyrandish Koshkoei, 2002; Alavi et al., 2007).

***Thrips tabaci* Lindeman, 1889**

Material examined: Zabol university, 17m, 3♀ On Wheat, 16. III .2010. Banmak: 12m, 5♀ on Bean, 8. VII. 2010. Pole-nahr-ab, 33m, 9♀ on Wheat, IV. 2010. Mianangi, 17m, 9♀ on Melon, 7. VI. 2010. Mianangi: 17m, 6♀ on Water melon, 7. VI. 2010. Pole-nahr-ab, 17m, 5♀ on Barely, 13. IV. 2010. Sade Sistan, 9m, 7♀ on Alfalfa, 14. V. III. 2009. Zabol: 14m, 1♀ on Chamomile; 1♀ on Drill, 22. IV. 2011.

Hosts: Polyphagous on Large numbers of plants.

Distribution: Cosmopolitan. In Iran: *T. tabaci* was first reported from Iran by Afshar (1938) on Tobacco, Cotton, Cucumber, Potato, Onion and Cabbage. *T. tabaci* is wide-spread in Iran and has been reported from most of areas in Iran (Salavatian, 1959; Farahbakhsh, 1961; Shojai, 1971; Zahedi, 1992; Modarres Awal, 1994), Azarbaijan-e-Gharbi Province (Akbarzadeh Shokat & Rezvani, 1998; Akbarzadeh Shoukat & Shayesteh, 2006), Azarbaijane-Sharghi Province (Hassan-Zadeh Salmasi, 1997; Mashhadi Jafarlo & Malkeshi, 2000; Mansouri et al., 2004; Taghizadeh et al., 2004), Fars Province (Javan Moghadam et al., 2000; Noori et al., 2000; Minaei et al., 2002; Alemansour & Fallahzadeh, 2004), Gilan Province (Etebari et al., 2000), Golestan Province (Gilasias, 2000; Alavi & zur Strassen, 2002; Mojeni, 2002; Alavi, 2004; Khormaly, 2004), Hamadan Province (Khanjani & Mirab Baluo, 2005a,b), Isfahan Province (Seyedoleslami & Naderi, 1993; Etebari & Hesami, 2002; Kalafchi et al., 2002; Saeidi et al., 2002) Kerman Province (Moharramipour et al., 2000; Teraz & Kheyrandish Koshkoei., 2002) Khorasan-e-Janubi Province (Moodi, 2002; Shahrokhi & Rahimi, 2003; Rahimi et al., 2004), Khorasan-e-Razavi Province (Abbasifar, 2004), Mazandaran Province (Farahbakhsh, 1961), Tehran Province (Davatchi, 1949; Farahbakhsh, 1961; Shojai, 1989; Javan Moghadamet al., 2000; Mirkarimi, 2000; Noori et al., 2000; Hosseininna & Malkeshi, 2004; Jalili Moghadam & Azmayesh Fard, 2004; Khani et al., 2004; Yazd Province (Mohaghegh & Kheyrandish Koshkoei, 2002). (Noori et al., 2000; Javan Moghadam et al., 2000), Khorasan-e-Shomali Province (Alavi & Kamali, 2003), Khuzestan Province (Cheraghian, 1996; Cheraghian & Hojat, 1998; Bagheri & Mosadegh, 2000; Bagheri et al., 2002; Bagheri et al., 2005b,c), Lorestan Province (Jafari & Fallahzadeh, 2004; Alavi et al., 2007).

Suborder Tubulifera

Family Phlaeothripidae

***Ataliothrips reuteri* (Bagnall, 1913)**

Material examined: Pole-nahr-ab, 33m, 1♂ on Wheat, 13. IV. 2010. Zabol: 14m, 1♀+2♂ on French Tamarik; 1♀+2♂ on Common Mallow, 22. IV. 2011.

Distribution: Iranian record: Reported first time from Kerman Province By (Barkhordari et al., 1981). Kerman Province (Mortazaviha & Dern, 1967), Kerman Province (Behdad, 1988), Jirift Province (Teraz & Kheyrandish Koshkoei, 2002; Bhatti et al., 2009).

***Haplothrips aculeatus* (Fabricius, 1803)**

Material examined: pole-nahr-ab, 33m, 3♀ on Wheat, 13. IV. 2010.

Hosts: Poaceae.

Distribution: Palaearctic. Iranian records: This species was reported coincidently as a new record for Iran from Golestan province by Alavi (2000). Golestan province (Gilasian et al., 2000), Kerman Province (Kheyrandish Koshkoei et al., 2000b), Fars Province (Minaei & Alich, 2001; Alavi et al., 2007).

***Haplothrips eragrostidis* Priesner, 1931**

Material examined: Zabol: Zabol university, 17m, 6♀ +1♂ on Wheat, 16. III . 2010. Banmak: 12m, 3♀+2♂ on Bean, 8. VIII. 2010. Pole-nahr-ab: 15m, 3♀ On Alfalfa, 14. VIII .2009. Mianangi: 17m, 3♀ + 1♂ On Melon, 7. V. III. 2010. Mianangi: 7m, 1♀ on Water Melon, 7. VIII. 2010.

Hosts: Poaceae (zur Strassen et al. 2003).

Distribution: Egypt, Palestine (zur Strassen et al., 2003), Golestan Province (Alavi & zur Strassen, 2002).

***Haplothrips reuteri* (Karny, 1907)**

Material examined: Mianangi: 17m, 4♀ +2♂ on Melon, 7. VIII. 2010. Sade Sistan, 9m, 1♀ on Alfalfa, 14. VIII. 2009.

Hosts: Flowers of various plants.

Distribution: Mongolo-Mediterranean. Iranian records: *H. reuteri* was first reported from Iran by Priesner (1954) who recorded the thrips from Shiraz (Fars Province). Fars Province (Minaei & Alich, 2001), Ghazwin Province (Mortazawiha & Dern, 1977), Ghom Province (Mortazawiha & Dern, 1977), Kerman Province (Kheyrandish Koshkoei, 2000; Kheyrandish Koshkoei et al., 2000b; Moharrampour et al., 2000; Teraz & Kheyrandish Koshkoei, 2002), Khorasan-e-Janubi province (Rahimi et al., 2003; Rahimi et al., 2004), Khorasan-e-Shomali Province (Alavi & Kamali, 2003), Khuzestan Province (Cheraghian & Hojat, 1998; Bagheri et al., 2002; Bagheri et al., 2005c), Lorestan Province (Jafari & Fallahzadeh, 2004), Mazandaran Province (Cheraghian & Barimani Varandi, 2000), Tehran Province (Mortazawiha & Dern, 1977; Jalili Moghadam & Azmayesh Fard, 2004), Zanjan Province (Mortazawiha & Dern, 1977), Yazd Province (Mohaghegh & Kheyrandish Koshkoei, 2002; Alavi et al., 2007).

***Haplothrips tritici* (Kurdjumov, 1912)**

Material examined: Zabol: Zabol university, 17m, 1♀ On Wheat, 16. III. 2010. Wheat, 13. IV. 2010. Zabol: 14m, 2♀ on Earth Smoke; 1♀ On Common Mallow, 1♀ on Barley, 13. IV. 2010.

Pole-nahr-ab, 33m, 1♀ On 22. IV. 2011.

Hosts: Poaceae.

Distribution: West Palaearctic. Iranian records: *H. tritici* was first reported from Iran by Davatchi (1949) on wheat from Tehran (Tehran Province), Yazd Province, Rafsanjan and Kerman (Kerman Privanice). Azarbaijan-e-Gharbi Province (Farahbakhsh, 1961; Behdad, 1982), Azarbaijan-e-Sharghi Province (Farahbakhsh, 1961; Behdad, 1982; Hassan-Zadeh Salmasi, 1997), Chaharmahal-Bakhtiary Province (Behdad, 1982; Rowshandel, 2002), Fars province (Minaei & Alich, 2001), Isfahan Province (Bagheri & Radjabi, 2000; Behdad, 1982), Kerman Province (Davatchi, 1954; Behdad, 1982), Kheyrandish Koshkoei, 2000; Takaloozadeh & Zohdi, 2000; Teraz & Kheyrandish Koshkoei, 2002), Kermanshah Province (Farahbakhsh, 1961; Behdad, 1982), Khorasan-e-Shomali Province (Alavi & Kamali, 2003), Khuzestan Province (Behdad, 1982; Cheraghian, 1996; Cheraghian & Hojat, 1998), Kordestan Province (Kamangar & Radjabi, 2000), Lorestan Province (Shekarian & Rajabi, 2004), Tehran Province (Farahbakhsh, 1961; Behdad, 1982; Azmayesh Fard & Faridi, 1993), Semnan Province (Behdad 1982), Yazd Province (Devatchi, 1954; Behdad, 1982; Mohaghegh & Kheyrandish, Koshkoei, 2002; Teraz & Kheyrandish, Koshkoei 2002), Zanjan province (Azmayesh Fard & Faridi, 1993; Alavi et al., 2007).

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Table 1. The list of *Aeolothrips* species reported in Iran (Bhatti et al. 2009; Azarmi et al. 2010; Alavi et al. 2011).

	Species
1	<i>Aeolothrips afghanus</i> Jensen, 1984
2	<i>A. collaris</i> Priesner, 1919
3	<i>A. deserticola</i> Priesner, 1929
4	<i>A. albicinctus</i> Haliday, 1836
5	<i>A. faciatus</i> (Linnaeus, 1758)
6	<i>A. gloriosus</i> Bagnall, 1914
7	<i>A. heinzi</i> zur Strassen, 1990
8	<i>A. intermedius</i> Bagnall, 1934
9	<i>A. mongolicus</i> Pelikan, 1985
10	<i>A. tenuicornis</i> Bagnall, 1926
11	<i>A. versicolor</i> Uzel, 1895
12	<i>A. balati</i> Pelikan, 1956
13	<i>A. citricinctus</i> Bagnall, 1993
14	<i>A. modestus</i> zur Strassen, 1965
15	<i>A. wittmeri</i> Priesner, 1935
16	<i>A. eremicola</i> Priesner, 1938



Figure 1. (A) *A. eremicola* ♂, (B) *A. eremicola* ♀, (C) Antennal segments ♀, (D) Antennal segments ♂, (E) Tergite IV-X ♂.