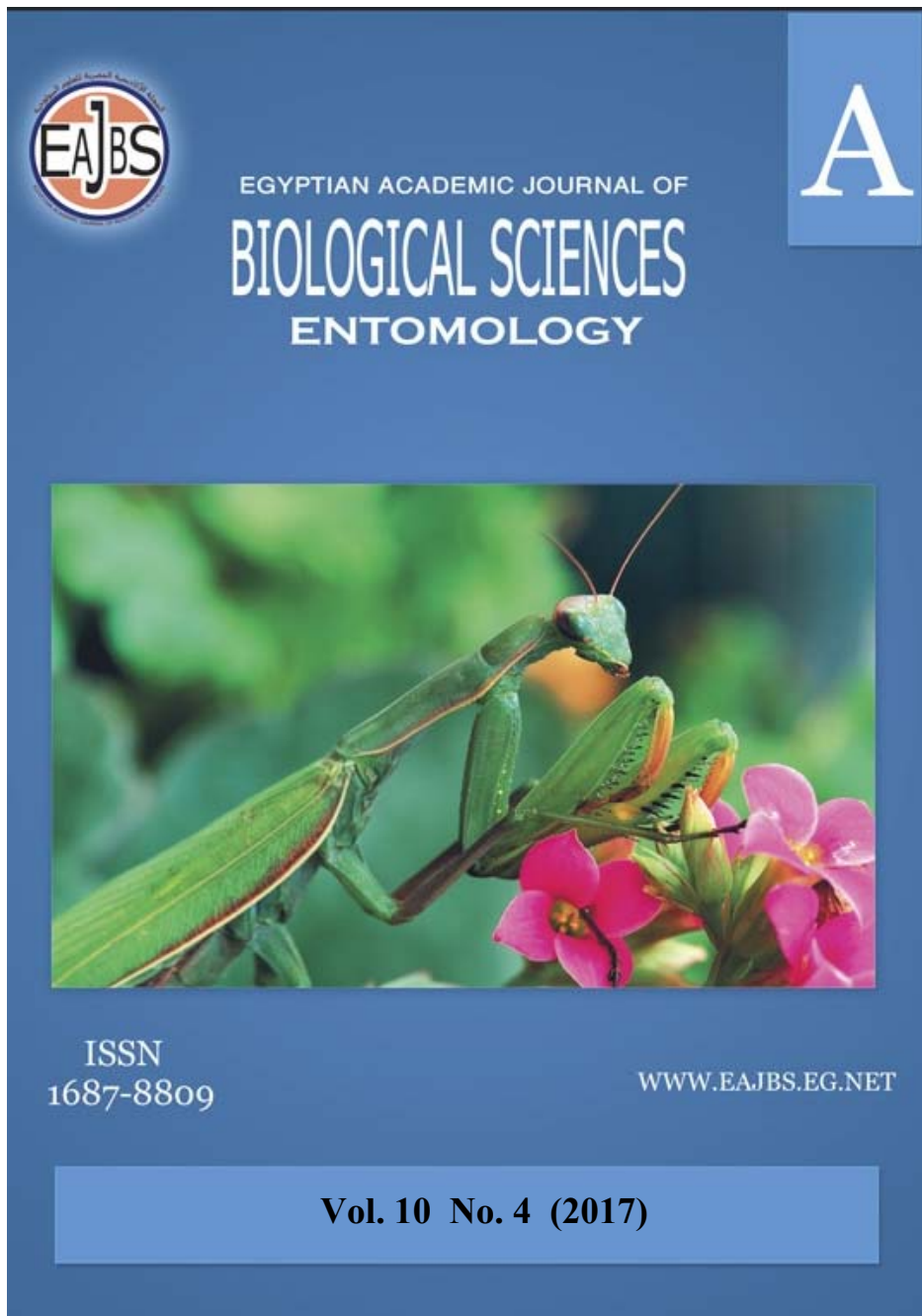
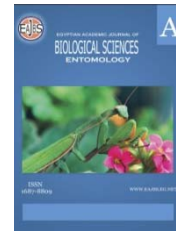


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The Egyptian Thripid Species in Olive Groves at Ismaialia, Egypt

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ABSTRACT

Thripid species were represented by seven species in olive groves at Ismailia governorate during 2013 and 2014 on different cultivars (El-Egazy; Manzanillo and Pequal) and weeds in olive groves. The species are *Frankliniella occidentalis* (Pergande); *Thrips microchatus* Karny; *Scirtothrips aurantii* Faure; *Haplothrips cahirensis* Karny; *Dendrothrips eremicola* Priesener; *Thrips tabaci* Lindeman and *Sericothrips kassimanus* Priesener. First three species are represented in olive trees as a new host. The second three were represented in olive trees before. The last species was recorded on *Cynanchum acutum* presented under and between olive trees.

The Egyptian species are described and figured. Also, synonyms and geographical distribution are given.

INTRODUCTION

The olive trees *Olea europaea* L. originated in the Eastern Mediterranean area since ancient times. In Egypt, it has been cultivated for thousands years. Olive production ranked second crop after citrus. The area under cultivation with olive reached 237,454 feddans in 2014. Ismailia governorate is considered to have the largest area in Lower Egypt (*i.e.* 19,691 feddans). (Ministry of Agriculture and land reclamation, Economic Affairs Sector, 2014).

Thrips feed on tender parts of the olive tree such as buds, developing leaves, developing inflorescences, flowers, fruits and tender bark causing leaves deformation, yellowish white blotches on lower surfaces, leaves curl, leaves defoliation and fruit deformation with deep hollows in ripe olive, fruit defoliation when attacked in early season and infested fruit become smaller (Katsomyannos, 1992; Tzanakakis, 2003; Tombesi *et al.*, 2007 and Al-Ibrahim *et al.*, 2010). In Egypt, the Tubulifer species *Haplothrips cahirensis* Trybom and *H. siwacus* Priesener were recorded for the first time on olive trees by Priesener (1965). Also, *Liothrips oleae* (Costa) and *Karnyothrips flavipes* (Jones) were recorded on olive trees for the first time by Moursi and Mesbah (1985) as a new record. Similarly, *Liothrips oleae* was recorded on olive by Abdel-Rahman, (1995); Mosallam, (1999) and Abd-Rabou, (2009). The terebrantian species *Thrips tabaci* and *Dendrothrips eremicola* Priesener were recorded on olive by Mosallam, (1999) and El-Kholy, *et al.* (2009).

Aim of this study was to identify and describe the thrips species infesting olive trees and associated weeds at Ismailia governorate.

MATERIALS AND METHODS

Survey of thrips species on olive trees cultivars (El-Egazy; Manzanillo and Pequal) was carried out through two years, from January 2013 to December 2014. Regular samples were collected half monthly from each cultivar at Sarabyom, Ismailia Governorate. Samples were collected from new branches (25 cm. long) at three heights from ten random trees. Three replicates were collected from each height.

Collected samples were kept in paper bags and transferred immediately to the laboratory. The specimens mounted in Hoyer's media were directly examined microscopically. Different keys of order Thysanoptera were used as Balley (1957); Priesener (1960); Mound and Walker (1982); Mound and Kibby (1998) and El-Wakkad (2007).

RESULTS AND DISCUSSION

The results revealed the presence of seven thrips species recorded on olive trees and associated weeds at Ismailia. These species belong to six genera under two families (Phlaeothripidae and Thripidae) derived from two main (Tubulifera and Terebrantia).

Key suborders, families, subfamilies, genera, species of order Thysanoptera.

- 1-Last abdominal segmented tube shaped (Fig. 1); females without ovipositor; fore wing without microtrichia or veins (Fig. 3); head with articulation
suborder **Tubulifera**
**Phlaeothripidae**
subfamily **Phlaeothripinae**
*Haplothrips cahirensis* Trybom
- Last abdominal segmented conical shaped (Fig. 2); females ovipositor saw shaped; fore wing with microtrichia and veins (Fig. 4); head without articulation
suborder **Terebrantia**
**Thripidae**.....2
- 2-Pronotum with large blotch medially.....subfamily **Sericothripinae**
*Sericothrips kassimanus* Priesener
- Pronotum without large blotch medially.....3
- 3- metanotumfurca with lyre-shaped, without spinula and extended to mesonotum (Fig. 5); fore wing curved at apex to join posterior margin (Fig.6)
subfamily **Dendrothripinae**
*Dendrothrips eremicola* Priesener
- metanotumfurca with normal-shaped, with or without spinula; fore wing not curved at apex to join posterior margin.....subfamily **Thripinae**.....4
- 4-ctenidia absent; abdominal tergites with microtrichia laterally (Fig. 7);
*Scirtothrips aurantii* Faure
- ctenidia present; abdominal tergites without microtrichia laterally.....5
- 5-tergites V-VIII with one pair of ctenidia anterior to spiracles (Fig 8)
*Frankliniella occidentalis* (Pergaade)
- V-VIII with one pair of ctenidia posterior to spiracles (Fig. 9)
*Thrips*.....6
- 6-Forewings with 4-5 setae on distal half (Fig 10); pleurotergites with one setae (Fig. 11); sternits without discal setae.....*T. tabaci* Lindeman

-Forewings with 3 setae on distal half (Fig. 12); pleurotergites with three setae (Fig 13); sternits with three to four rows of discal setae.....*T. microchatus* Karny

Order Thysanoptera

1- Suborder Tubulifera

Suborder Tubulifera represented in the world by one family Phlaeothripidae. The subfamily Phlaeothripinae represented on olive trees at Ismailia by one genus and one species *Haplothrips cahirensis*.

Haplothrips cahirensis Trybom, 1911

Synonyms:

Anthothrips cahirensis Trybom, 1911. Res. Schwed. Exped. Egypt p. 10.

Haplothrips cahirensis karny, 1912. Zool. Ann., p.326.

Common name:

Pit and soft scale thrips

Description:

Female blackish-brown (Fig 14), fore tibia yellow with brown base, fore tarsus yellow. Head elongate; postocular setae blunt; Antennae eight segmented (Fig. 15), segment III with two sense-cone, IV with four sense-cone (Fig. 16); maxillary stylets short, not reached to postocular setae, maxillary bridge well developed (Fig. 17). Pronotum with five pairs of capitate major setae (Fig. 18), prosternal basantra broad and kidney shape, ferna triangle shaped (Fig. 19); mid and hind tarsi two segments; forewings with nine duplicated cilia. Pelta triangular (Fig. 20); tergites II–VII with two pairs of sigmoid wing-retaining setae (Fig. 21).

Host plants:

Common on several plants as *Aerva tomentosa* (desert cotton), *Convolvulus arvensis* (Bindweed), *Acacia nilotica* (Nile acacia), *Parkinsonia aculeate* (Jerusalem thorn), *Ceratonia siliqua* (Carob), *Mangifera indica* (Mango), *Vitis vinifera* (Grape), *Ficus carica* (Fig.) Citrus Spp. and *Olea europaea* (Olive). This *Haplothrips* is a predator on other insects, particularly thrips, coocids and red spider (Priesener, 1965). In this study, this species was collected in high numbers.

Distribution:

Egypt: All over Egypt, Sinai, Gebel Elba and Ismailia.

World: Sudan, Israel, Kenya, Iran.

2- Suborder Terebrantia

Suborder Terebrantia represented on olive trees at Ismailia by one family Thripidae. The family included three subfamilies as follow:

1-The subfamily Sericothripinae

The subfamily Sericothripinae represented on olive trees at Ismailia by one genus and one species *Sericothrips kassimanus*.

Sericothrips kassimanus Pries.

Synonyms:

Sericothrips kassimanus Priesner, 1960. A Monograph of the Thysanoptera of the Egyptian Deserts. Pub. de la Inst. Desert Egy., 13: 1–549.

Hydatothrips kassimanus .Bhatti, J. S. 1973. A preliminary revision of *Sericothrips* Haliday, Sensu Lat., and related genera, with a revised concept of the Tribe Sericothripini (Thysanoptera: Thripidae). Oriental Insects. Vol. 7(3): 403-449.

Common name:

Blood flower thrips.

Description:

Body yellowish brown with brown line on tergite except tergites IV-VI yellow in color (Fig. 22). Head broad, with transverse sculpture in fore third, the mid third

with reticulation and the hind third clear; antennae eight segments (Fig. 23), III-IV with forked sense-cone (Fig. 24); interocellar setae with three pairs, posterocellar setae with 4-6 pairs of short setae; mouth-cone blunt, maxillary palpi three segments, and labial palpi one segment. Pronotum broad, with reticulation (Fig. 25), antero and posteromargial with two rows of setae; mesonotum broad, with pair of apodem extended to posteromargial of pronotum and two pairs of short setae; metanotum broad, with two pairs of short setae, metafurca with spinula; forewings brown with yellow base, covered in microtrichia, fore vein with complete row of dark long setae, second vein without setae, costal vein with complete row of long setae. Abdomen with antecostal ridge (Fig. 26); tergites I-VIII covered in microtrichia, with complete row of long setae medially; posteromargial of tergites VII-VIII with complete row of short setae (Fig. 27), tergites I-IV with two row of short setae laterally.

Host plants:

Cynanchum acutum. (Priesener, 1965). Also in this study, *S. kassimanus* represented on *Cynanchum acutum* associated with olive trees. **Distribution:**

Egypt: Helwan and Ismailia.

World: India.

2- The subfamily Dendrothripinae

The subfamily Dendrothripinae represented on olive trees at Ismailia by one genus and one species *Dendrothrips eremicola*

Dendrothrips eremicola Priesner, 1965

Synonyms:

No synonyms are available. *Dendrothrips eremicola* Priesner, 1965 was described by Priesner in his Monograph of the Thysanoptera of the Egyptian Deserts Published by the Desert Research Institute, Egypt (13:1-549).

Description:

Body yellowish-brown with dark spots on laterals of tergites (Fig. 28). Head broad, with reticulated area behind compound eyes, front with two concave (Fig. 29); antennae eight segments (Fig. 30), antennal segments III-IV with forked sense-cone; interocellar setae with two short pairs; mouth-cone broad, maxillary palpi two segments, and labial palpi one segment (Fig. 31). Pronotum broad, without setae (Fig. 32); metafurca elongate, with lyre-shaped and extended to mesonotum (Fig. 5); forewing curved at apex to join posterior margin, with row of fine setae, anterior cilia arising behind anterior margin of wing (Fig. 6); hind tibia with two teeth (Fig 33), hind tarsus with terminal tooth (Fig. 34). Tergites I-VIII with two pairs of median setae, each side with reticulation and two dark spots; posteromargial of tergite VIII with comb of microtrichia (Fig. 35).

Host plants:

D. eremicola was recorded on wild shrubs of family Oleaceae by Priesener, (1965) and recently it was represented on olive trees by El-Kholy *et al.*, (2009). It was the most abundant on olive trees among the total number of thrips collected in the present study.

Distribution:

Egypt: Gebel Elba, Wadi Ideb and Ismailia.

3- The subfamily Thripinae

The subfamily Thripinae represented on olive trees at Ismailia by three genus and four species as follow:

I-Frankliniella occidentalis (Pergaade), 1912

Synonyms:

Frankliniella occidentalis (Pergaade), Kamy, 1912. Zool. Ann., 4:335.

Frankliniella tritici Moultoni, Hood. 1914. Proc. Ent. Soc. Wash., 16:38.

Frankliniella californica Moulton, 1948. Rev. de Ent., 19(1-2):98.

Common name:

Western flower thrips

Description:

Female yellow in color with brown one patch on each tergite (Fig. 36). Head broad, posterior half with sculpture; antennae eight segments (Fig. 37), antennal segments III-IV with forked sense-cone near apex; interocellar with three pairs, third pair long and dark, postocular setae with five short pairs and one long pair arising behind compound eyes (Fig. 38); mouth cone broad, maxillary palpi three segments, and labial palpi one segment (Fig. 39). Pronotum broad, with five pairs of major setae (Fig. 40); metanotum with two pairs of dark long setae, campaniform sensilla present (Fig. 41); fore wings with dark long setae as two complete rows, costal vein with complete row of dark long setae; tarsi with two segments, hind tarsus with terminal tooth. Pleurotergites III-VII transverse sculpture, without microtrichia, with one dark long seta posteroangular; V-VIII with one pair of ctenidia, tergite VIII with comb of microtrichia arising from triangular bases posteromarginally.

Host plants:

F. occidentalis attacks many plants as grape, mango, orange, apple, guava, bindweed, *Chrysanthemum morifolium*, , *Gladiolus grandiflora*, *Ipomoea tricolor*, *Petunia hybrid*, *Crinum moorei*, *Coleus hybridus* and cucumber and pepper (El-Wakkad, 2007; Abd EL-Wahab *et al.*, 2011; Abd EL-Wahab *et al.*, 2012 and Shalaby 2015). This species represented on olive as a new host in Egypt and collected by a few numbers.

Distribution:

Egypt: Kalubia, Giza and Ismaialia.

World: Israel, Japan, South Korea, China, Indonesia, Malaysia, Thailand, Vietnam, America, Europe and South Africa, Kenya, Australia (New Zealand).

II- *Thrips tabaci* Lindeman, 1888

Synonyms:

Thrips tabaci Lindeman, 1888. Schadl. Ins. d. Tabaks. i. Bessarabien, pp. 15, 61-65.

T. communis Uzel, 1895. Mon. Ord. Thys., p. 176.

T. bremnenii Moulton, 1907. U.S.D. A., Bull. Ent., Tech. Ser. No. 12, pp. 59-60.

Common name:

Onion thrips, Cotton thrips.

Description:

Female yellowish-brown (Fig. 42). Head as long as wide, with transverse sculpture; antennae seven segments (Fig. 43), antennal segments III-IV with forked sense-cone; interocellar setae with two pairs (Fig. 44), posterocellar setae with 6-7 pairs; mouth cone broad, maxillary palpi three segments, and labial palpi one segment. Pronotum wide, with sculpture transversely, posteroangular with two pairs of major setae, antero and posteromarginal setae with one row (Fig. 45); mesonotum reticulated, with three pairs of setae; metanotum furca with spinula, campaniform sensilla absent; forewing, first vein with 4-5 setae on distal half, second vein with complete row of long setae except basal area, costal vein present; hind tibia with two teeth, hind tarsus with five teeth. Tergite II-VII with three pairs of long posteromarginal setae, Pleurotergites III-VII covered in microtrichia, with one posteromarginal setae, V-VIII with one pair of ctenidia, tergite VIII with comb of short setae and pair of campaniform sensilla on distal half, sternites without discal setae.

Host plants:

Thrips tabaci is the most abundant thysanopteran in Egypt, it has a wide range of host plant as fruit trees, vegetables and ornamental plants (Priesner, 1965 and El-Wakkad, 2007) and olive trees (Mosallam, 1999). This species is represented in low numbers.

Distribution:

Egypt: All over Egypt.

World: World Wide.

III- *Thrips microchatus* Karny, 1922**Synonyms:**

Thrips microchatus Hood, 1932, Bull. R. Soc. Ent. Egypte, p119.

T. flavus var. *microchatus* Karny, 1922. Denkschr. Akad. Wiss. Wien, 98, p. 118.

Common name:

Grapevine leaf thrips.

Description:

Female yellow in color (Fig. 46). Head broad, with transverse sculpture; antennae seven segments (Fig. 47), sense-cone in III and IV forked; interocellar setae with two pairs, posterocellar setae with 6-7 pairs; mouth cone broad, maxillary palpi three segments, and labial palpi one segment. Pronotum broad, with four pairs of antero and posteroangular setae (Fig. 48); mesonotum broad, with one pair of dark short setae posteroangularly; metanotum with one pair of median setae; forewing first vein with three setae on distal half, second vein with complete row of long setae except basal area, costal vein present; hind tibia with three teeth, hind tarsus with two teeth (Fig. 49). Tergites with sculpture slightly, Pleurotergites III-VII with four setae entirely, V-VIII with one pair of ctenidia, tergite VIII with comb of microtrichia arising from triangular bases on posteromarginal (Fig. 50) and two pairs of campaniform sensilla, sternites with 3-4 rows of discal setae (Fig. 51).

Host plants:

T. microchatus exist on grape, desert cotton, *Pulicaria crispa* and *Triumfetta flavescens* (Priesner, 1965). In this study this species was recorded on olive trees as a new host plant in Egypt. It was represented by low numbers.

Distribution:

Egypt: Kalubia, Giza and Ismailia.

IV- *Scirtothrips aurantii* Faure, 1929**Synonyms:**

Scirtothrips aurantii Faure, 1929 Transv. Univ. Coll., Bull.18, p.3

Common name:

Citrus thrips.

Description:

Body yellow, with brown line on tergite (Fig. 52). Head broad; antennae eight segments (Fig. 53), antennal segments III-IV with forked sense-cone; three pairs of ocellar setae present, posterocellar setae with three pairs and equal in length with interocellar; mouth-cone pointed, maxillary palpi three segments, and labial palpi one segment. Pronotum broad, with four pairs of short setae on posterior margin, third pairs long and dark (Fig. 54); mesonotum small and broad, with three pairs of dark short setae; meso and metafurca with spinula (Fig. 55); hind tibia with three teeth; fore wings, first vein with 3 setae on distal half, second vein with 2-3 setae on distal half, costal vein present (Fig. 56). Abdomen with antecostal ridge; tergites II-VIII covered in rows of microtrichia, and three discal setae, posteromarginal with

one row of microtrichia; tergite VIII with complete comb of microtrichia on posterior margin (Fig. 57); Sternites covered in rows of microtrichia, posterior margins with comb of short setae.

Host plants:

S. aurantii was found some ornamental plants as Bindweed, Nile acacia, Graminae, *Cassia* and on some fruit trees as mango, guava, apple, grapes, citrus (Priesner, 1965 and El- Wakkad, 2007). In this study, this species was represent on olive trees as a new host by low number.

Distribution:

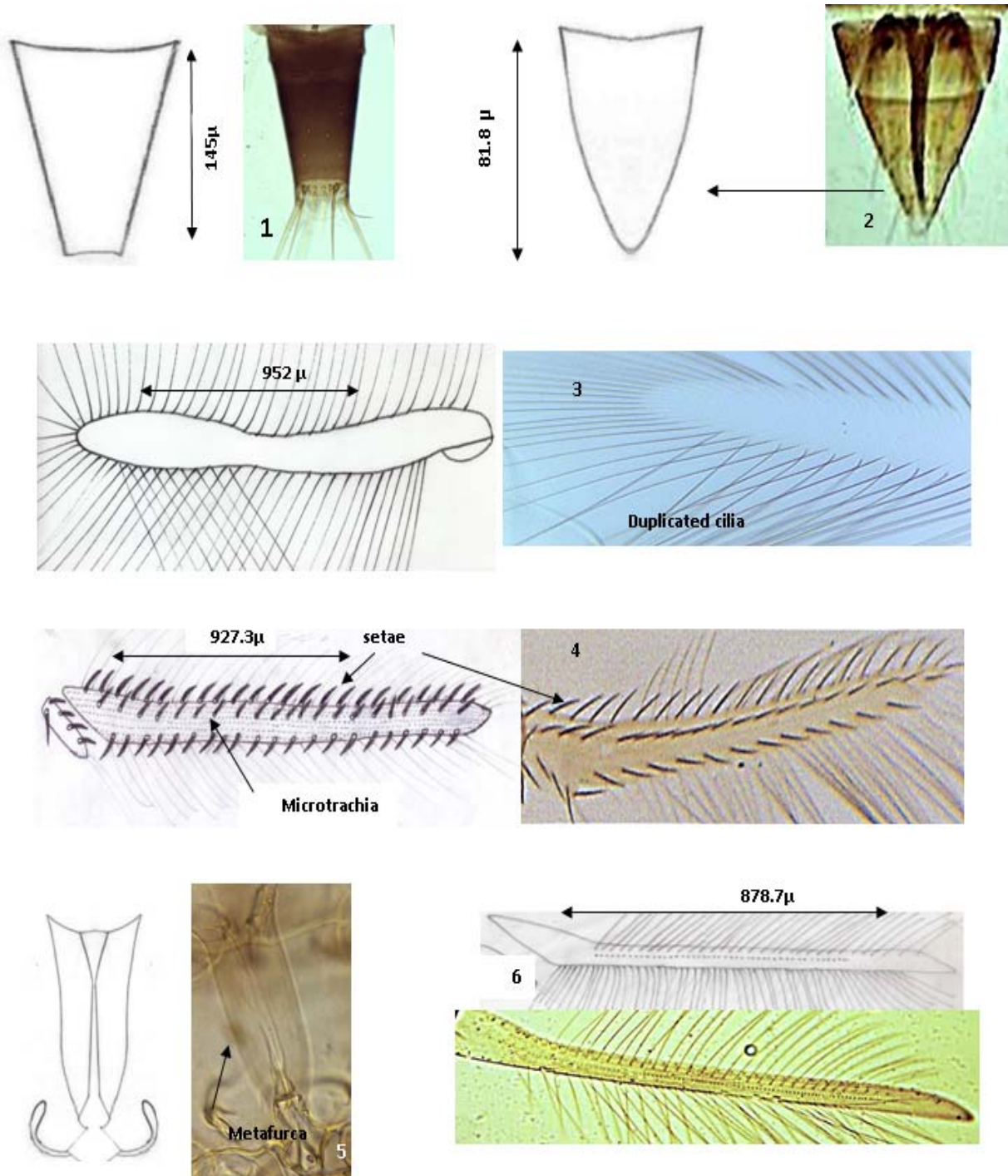
Egypt: Kalubia and Ismailia.

World: Sudan, South Africa.

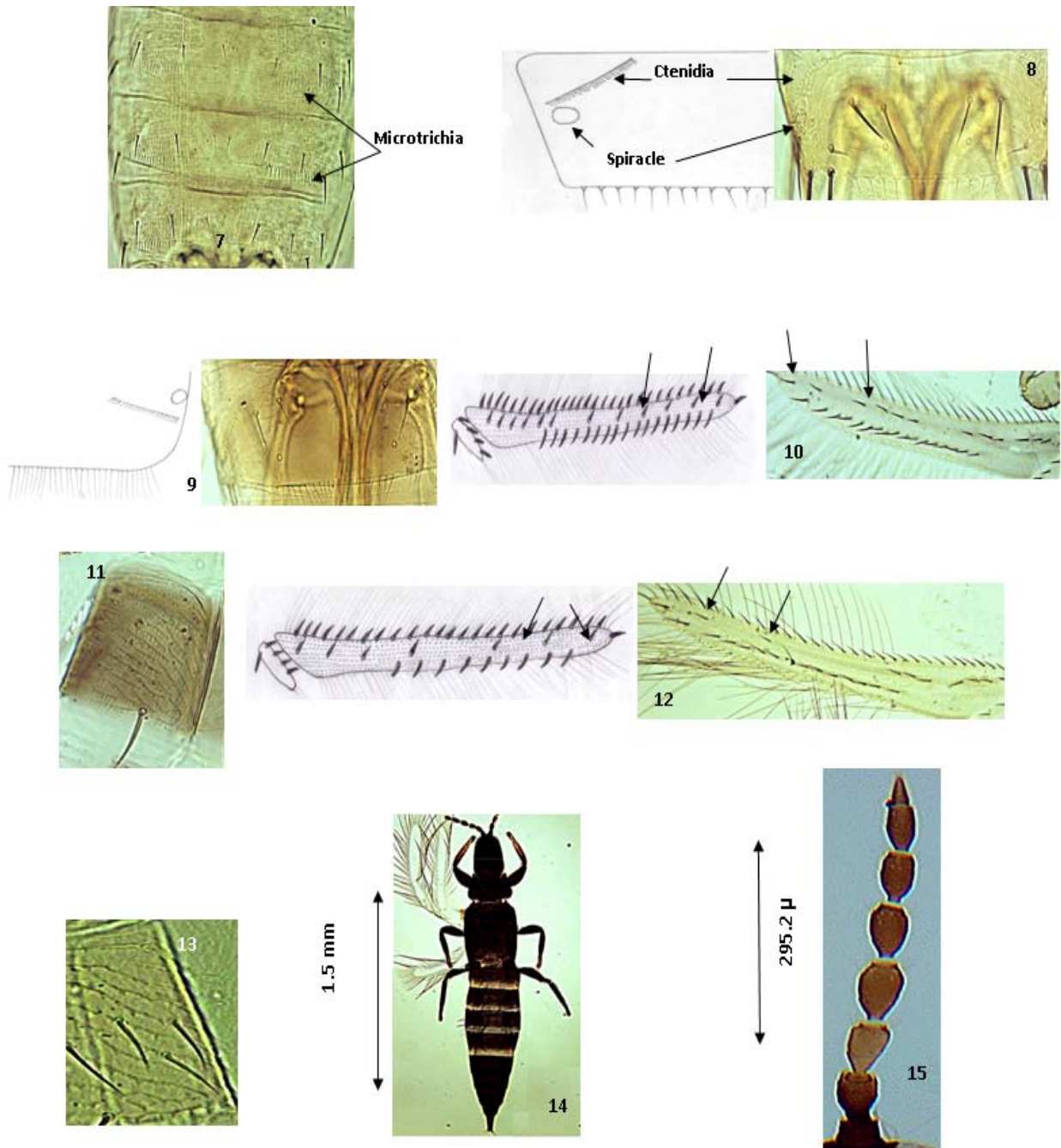
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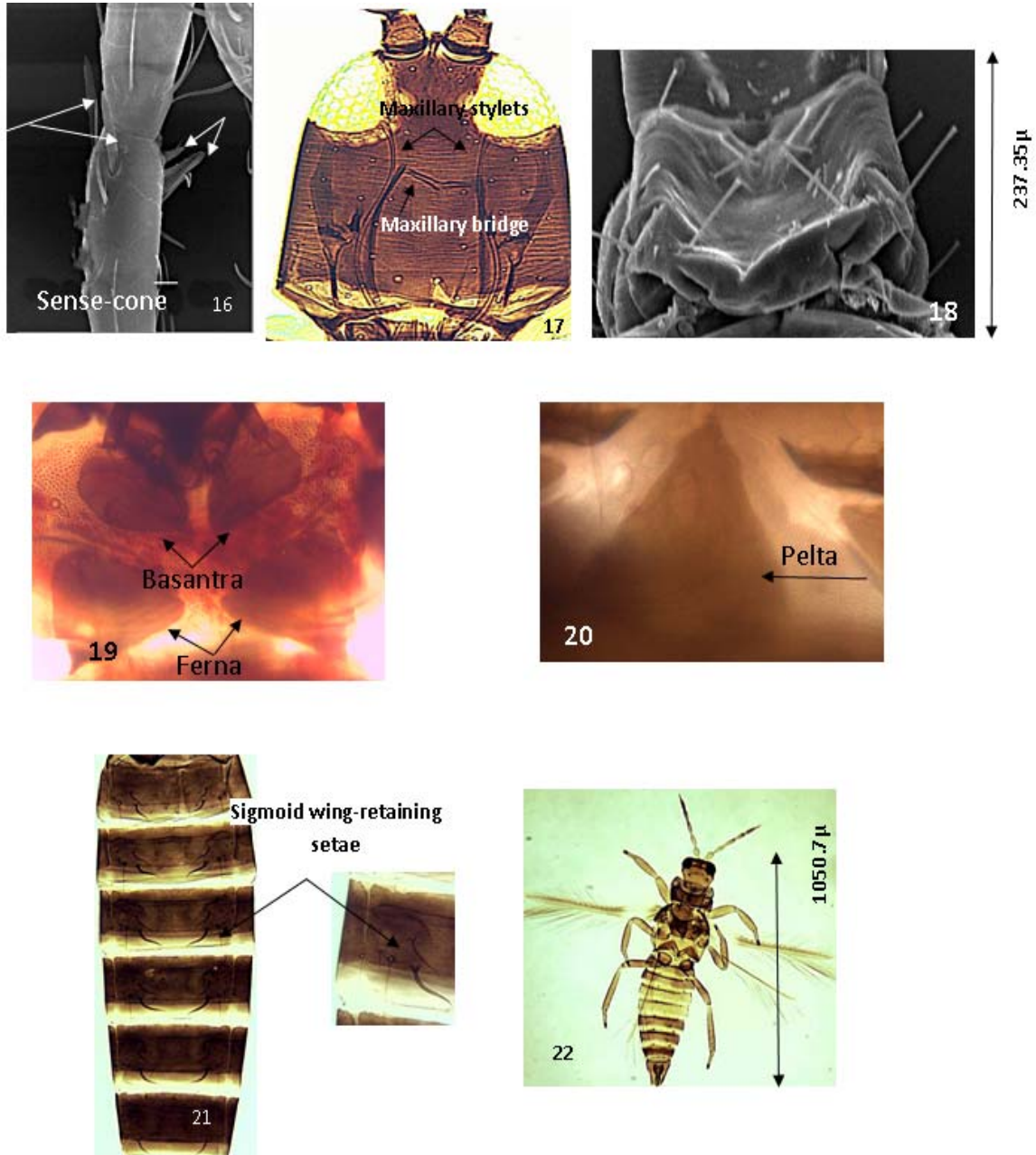
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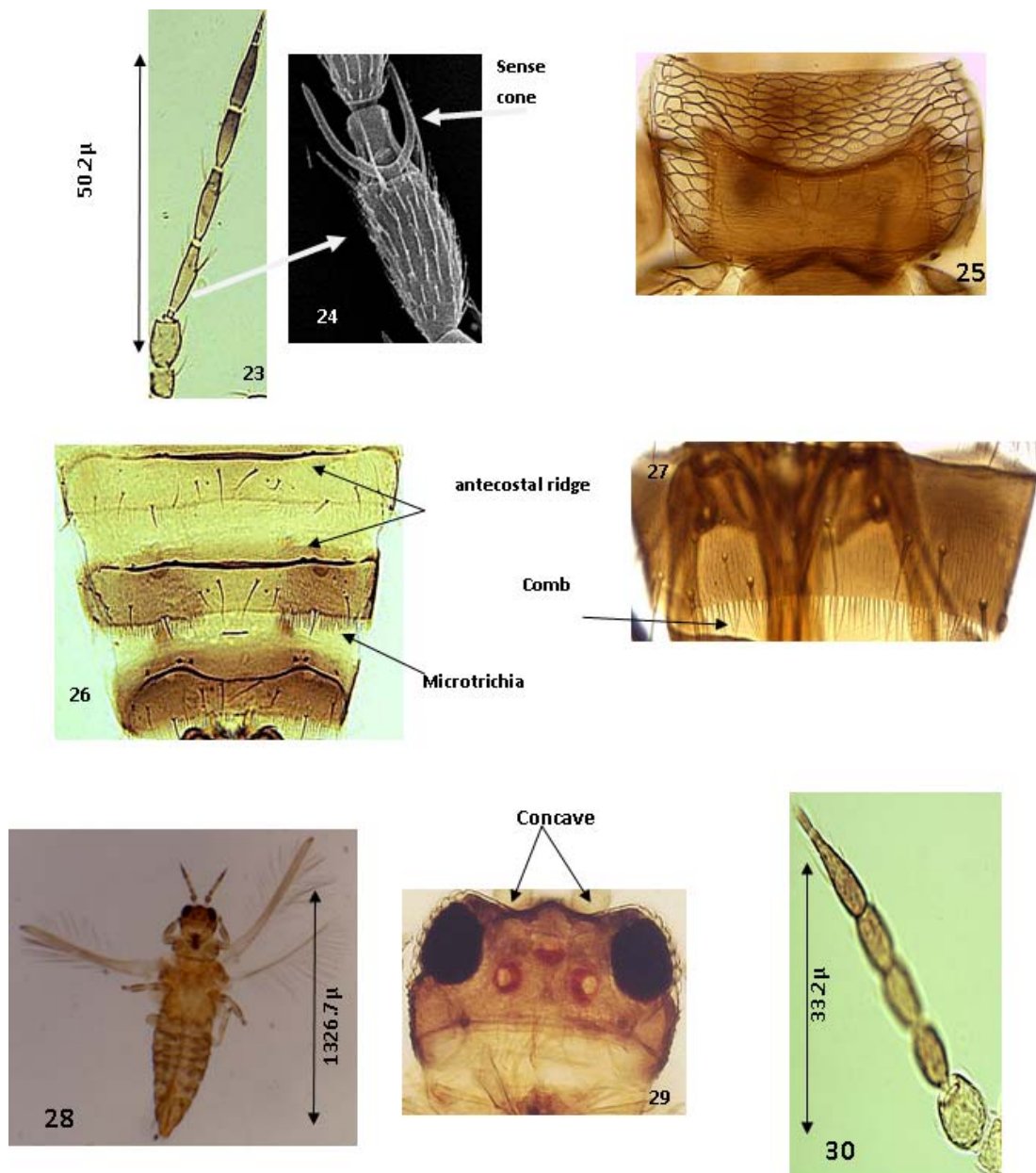
Figs. (1-2) last abdominal tergites: 1- *Haplothrips cahirensis*, 2- *Sericothrips kassimanus*; (3-4) forewings: 3- *H. cahirensis*, 4- *Frankliniella occidentalis*; (5-6) *Dendrothrips eremicola* : 5-Metafurca: 6 fore wing.



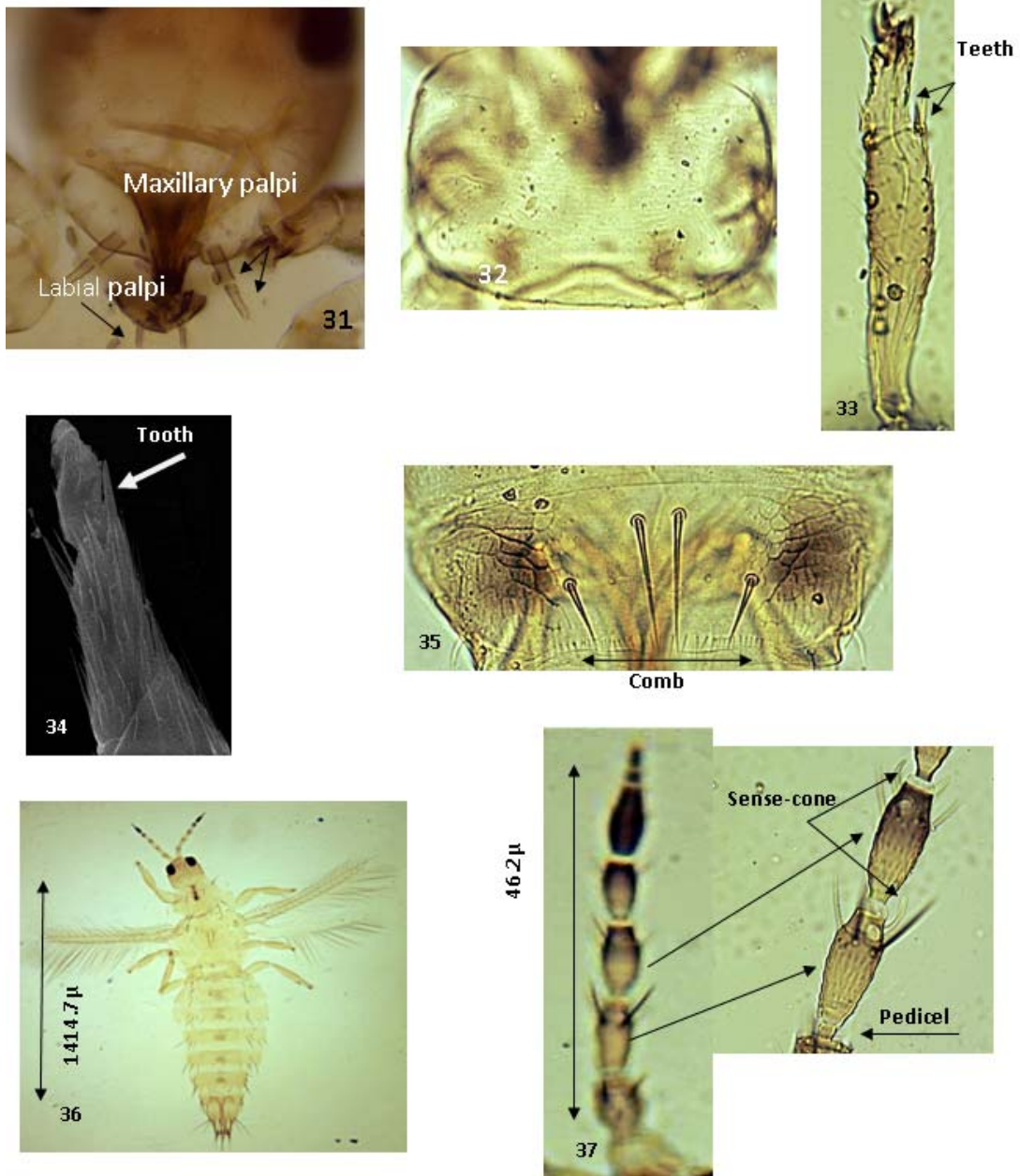
Figs. 7- abdominal tergites V-VII *Scirtothrips aurantii*; 8- tergite VIII: *F. occidentalis*; (9-11) *Thrips tabaci*: 9- tergite VIII, 10-fore wing, 11-pleurotergite; (12-13) *T. microchatus*: 12- forewing, 13- pleurotergite; (14-15) *H. cahirensis*: 14- female, 15- antennae.



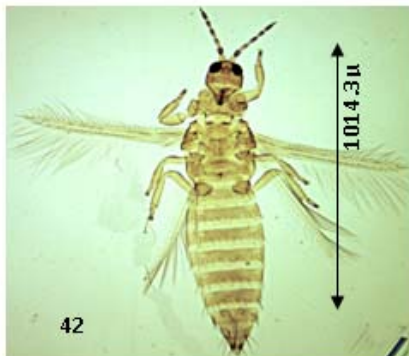
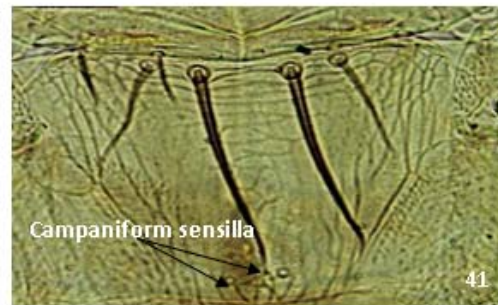
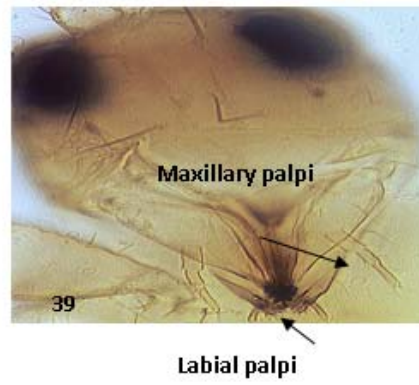
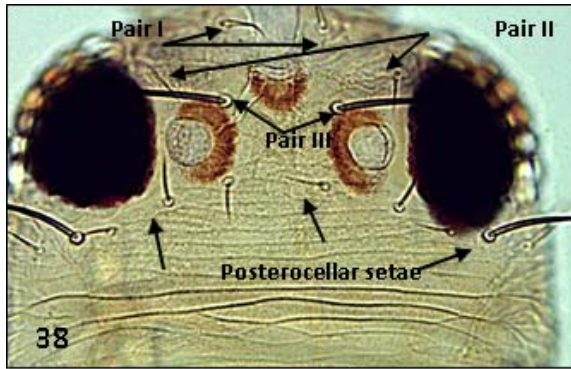
Figs. (16-21): *H. cahirensis* : 16- anten. segments IV, 17- head, 18- Pronotum (dorsal view), 19- Pronotum (ventral view), 20-first abdominal segment, 21- abdominal segments II-VI; 22- *S. kassimanus* male.



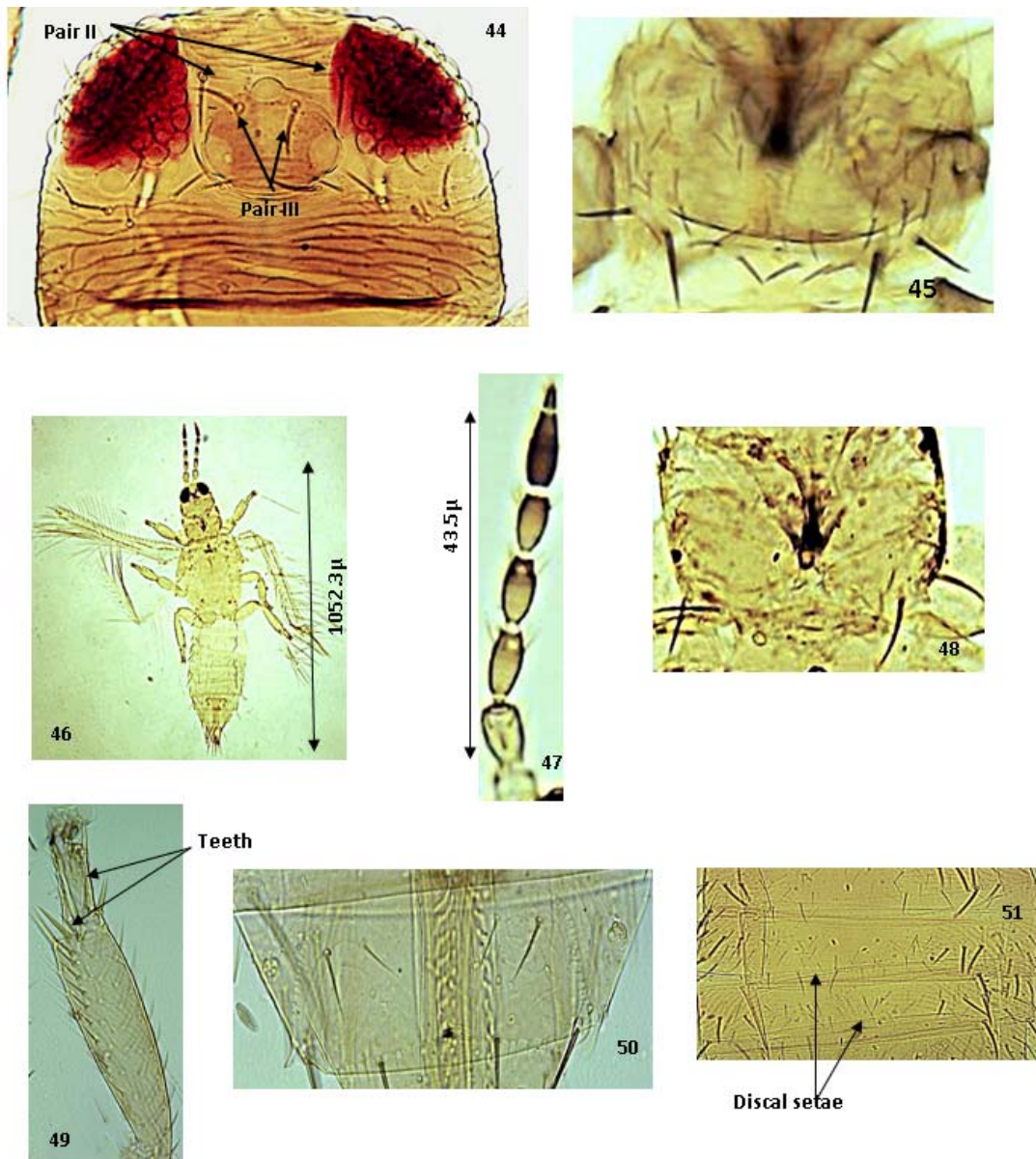
Figs. (23-27): *S. kassimanus*: 23-antennae, 24- antennal segment III, 20- Pronotum, 25- abdominal tergites V-VII, 26- tergite VIII; (28-30) *D. eremicola*: 28- female, 29- hesd, 30- antennae.



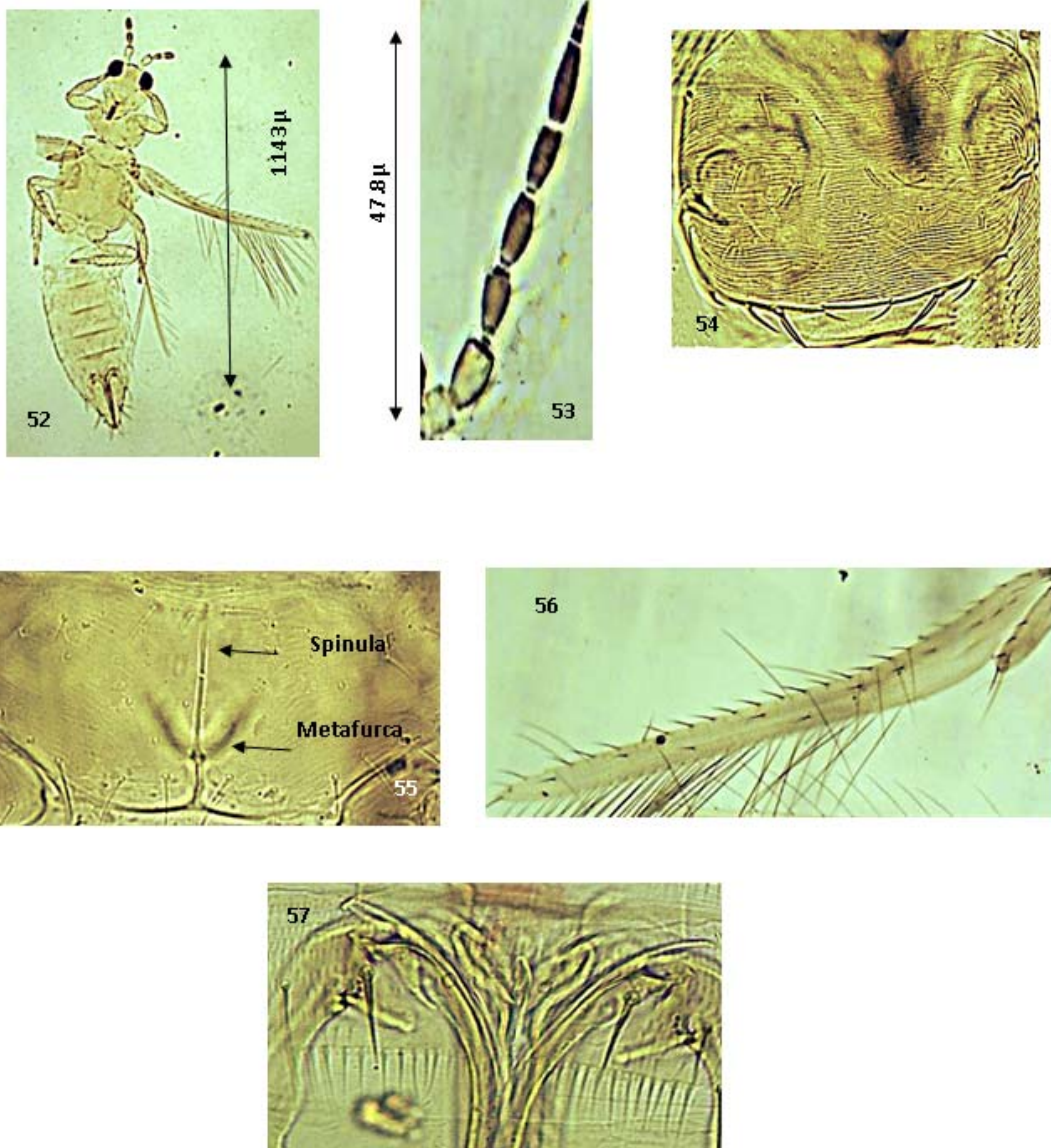
Figs. (31-35) *D. eremicola*: 31- mouth cone, 32- Pronotum, 33- hind tibia, 34- hind tarsus, 35- tergite VIII; (36-37) *F. occidentalis*: 36- female, 37- antennae.



Figs. (38-41): *F. occidentalis*: 38- Ocellar setae, 39- mouth cone, 40- pronotum, 41- metanotum; (42-43) *T. tabaci*: 42- female, 43- antennae.



Figs. (44-45): *T. tabaci*: 44- Ocellar setae, 45- pronotum; (46-51) *T. microchatus*: 46- female, 47- antennae, 48- Pronotum, 49- hind tibia, 50- tergite VIII, 51- discal setae.



Figs.(52-5): *Scirtothrips aurantii* 52- female, 53- antennae, 54- pronotum, 55- metanotum, 56- forewing, 57- tergite VIII.

ARABIC SUMMERY

أنواع التربس المصريه بمزارع الزيتون فى محافظه الاسماعيليه، مصر

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مُثلت أنواع التربس فى مزارع الزيتون بمحافظه الاسماعيليه بسبعه أنواع خلال ٢٠١٣ و ٢٠١٤ على أصناف مختلفه (العجيزى ; مانزنيلا و بيكوال) والحشائش الموجوده بمزارع الزيتون. الأنواع هى : فرانكيلا اوكدنتالس، تربس ميكروكاتس، سكرتوتربس اوريانتى، هابلوتربس كاهرنسيس، دندروتربس إرميكولا، تربس تاباسى، سيركوتربس كاسيمانس. الثلاثه أنواع الأولى مُثلت لأول مره على أشجار الزيتون. الثلاثه أنواع الثانيه مُثلت من قبل على أشجار الزيتون. النوع الأخير سجل على العليق سينانكم أكتيم الموجود تحت و بين أشجار الزيتون. وقد تم وصف وسم الأنواع المصريه. كذلك، تم إعطاء الإسم المرادف والتوزيع الجغرافى.

الكلمات الداله: تربس، سيزانوبترا، زيتون، تصنيف.