

**AN INVESTIGATION OF THE FRUIT FLIES
(DIPTERA: TEPHRITIDAE) FAUNA IN AJABSHIR REGION
(EAST AZERBAIJAN PROVINCE) WITH THE NEW RECORD
FROM IRAN (PART 1)**

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ABSTRACT: Based on specimens collected from Ajabshir region during 2009-2010, forty nine species of sixteen genera were recognized which *Orellia distans* Loew, 1847 is being newly reported for the Iran insect fauna. At the first part of this study, identification key and photos of the studied species are prepared. At the second part of this study, the locality, host plants, distribution of the studied species and references are prepared.

KEY WORDS: Tephritidae, Fruit flies, Ajabshir region, Iran, New record.

Tephritidae (true fruit flies) is a large family of the order Diptera with more than 4400 described species over the world. Considering their damage on fruit plantations, they are important insects from the agricultural point of view as well as forest entomology (Merz, 2001). Other species are important agents in biological control programs against weeds (White et al., 1992).

This family is recognized by the following characters: medium or small sized flies; vertical plate usually does not reach midpoint of frons and carries one or more orbital bristles; antennae with glabrous or plumose arista; wings usually with a pattern consisting of brown strips and spots, costal vein with two interruptions, one before humeral vein and one at place of ending of subcostal vein; abdomen in males with five and in females with six segments visible externally (Richter, 1989).

Ajabshir region is located in south west of East Azerbaijan province, close to eastern beach of the Urumiyeh Lake with UTM (Universal Transfer Mercator) coordinate system, X from 572964.47 to 599802.25 E; Y from 4147773.18 to 4161843.04 N and varying latitude from 1350 m to 2113 m. This area has rich grass lands with various species of Asteraceae, Apiaceae, Fabaceae and Ronunculaceae.

Before this study, Garajedaghi et al. (unpublished data) and Garajedaghi et al. (2011a,b,c), added sixteen genera and thirty nine species of fruit flies to the list of this region.

MATERIALS AND METHODS

Materials collected by sweeping net on flowers heads of Asteraceus plants in twenty-three localities which situated through the working area during 2009-2010 (Fig. 1).

The samples were killed in a killing jar containing potassium cyanide and specimens were deposited at Insect Museum of Tabriz University (IMTU). The terminology primarily follows White et al. (1999).

RESULTS

In this study, forty nine species of sixteen genera were collected in Ajabshir region. Of them, *Orellia distans* (Loew, 1847) is being newly record from Iran fauna. In addition, ten species are recorded for the first time from this region. The subfamilies, tribes and species are listed in alphabetic order.

Key to studied species of the family Tephritidae

1. Wing completely hyaline except pterostigma (Fig. 2 to 8) 2
- Wings with pattern or crossbands (Fig. 8 to 50) 8
2. With one pair of orbital bristles (Fig. 51) 3
- With two pairs of orbital bristles (Fig. similar to 52) 4
3. Whith darkned forefemora and midfemora *Urophora hermonis*
- Whith undarkned forefemora and midfemora *U. Impicta*
4. Without dark spots on abdominal tergites *Terellia luteola*
- Without dark spots on abdominal tergites 5
5. Mesonotum as long as wide and convex *Ter. virens*
- Mesonotum flat and distinctly longer than wide 6
6. Palpi not protruding beyond anterior oral margin (Fig. 52) *Ter. uncinata*
- Palpi protruding beyond anterior oral margin (Fig. 53, 54) 7
7. Length of basal segment of ovipositor equal to length of abdomen *Ter. fuscicornis*
- Basal segment of ovipositor shorter than abdomen *Ter. serratulae*
8. Wing with inconspicuous pattern (Fig. 9 to 12) 9
- Wings with distinct pattern or crossbands (Fig. 13 to 50) 12
9. Base of wing not completely hyaline (Fig. 9) *Tephritomyia lauta*
- Base of wing completely hyaline (Fig. 10, 11, 12) 10
10. Body in blackish color *Acanthiophilus helianthi*
- Body in yellowish color 11
11. With one pair of orbital bristles (Fig. 55) *Ensina sonchi*
- With two pairs of orbital bristles (Fig. similar to 52) *Ter. colon*
12. Wings with crossbands (Fig. 13 to 33) 13
- Wings with another form of pattern (Fig. 34 to 50) 33
13. Wing with one crossband (Fig. 13) *Sphenella marginata*
- Wing with three or four crossbands (Fig. 14 to 33) 14
14. Body in blackish color 15
- Body in yellowish color 24
15. Wing with 3 crossbands (Fig. 14, 15, 16) 16
- Wing with 4 crossbands (Fig. 17 to 23) 18
16. Mesonotum with brown stripes and spots *U. solaris*
- Mesonotum without brown stripes and spots 17

17. Aculeus apex with ill-defined secondary steps (Fig. 61)	<i>U. affinis</i>
- Aculeus apex without secondary steps (Fig. 62)	<i>U. stylata</i>
18. Aculeus apex without steps (Fig. 63, 64)	19
- Aculeus apex with steps (Fig. 65 to 69)	20
19. Subasal band of wing ending on hand margin of cell AN (Fig. 17)	<i>U. doganlari</i>
- Subasal band of wing not ending on hand margin of cell AN (Fig. 18)	<i>U. quadrifasciata</i>
20. Aculeus apex with one pair of subapical steps (Fig. 65, 66)	21
- Aculeus apex with two pairs of subapical steps (Fig. 67, 68, 69)	22
21. Wing with limber preapical and discal crossbands (Fig. 19)	<i>U. jaceana</i>
- Wing with right preapical and discal crossbands (Fig. 20)	<i>U. mauritanica</i>
22. Aculeus apex with smoothed out steps (Fig. 67)	<i>U. stalker</i>
- Aculeus apex with distinctly developed steps (Fig. 68, 69)	23
23. With greater length of interval between the primary and secondary steps of aculeus (Fig. 68)	<i>U. solstitialis</i>
- Without greater length of interval between the primary and secondary steps of aculeus (Fig. 69)	<i>U. terebrans</i>
24. Presutural dorsocentral setae present (Fig. 70)	25
- Presutural dorsocentral setae absent (Fig. 71, 72, 73)	26
25. Discal crossband arrive to beneath margin of wing (Fig. 24)	<i>Chaetorellia jaceae</i>
- Discal crossband not arrive to beneath margin of wing (Fig. 25)	<i>Chaetorellia australis</i>
26. Extension of cell cup extending well beyond bm-cu crossvein (Fig. 26, 27, 28)	27
- Extension of cell cup ending approximately in line with bm-cu crossvein (Fig. 29 to 33)..29	
27. In along of Sc vein, all crossbands are blended (Fig. 26)	<i>Orellia stictica</i>
- In along of Sc vein, all crossbands are not blended (Fig. 27, 28)	28
28. Preapical and apical crossbands not separate (Fig. 27)	<i>Or. falcate</i>
- Preapical and apical crossbands separate (Fig. 28)	<i>Or. distans</i>
29. Scutum with a black apical spot and pair of the base of each setae black basal spots (Fig. 72)	<i>Chaetostomella cylindrica</i>
- Scutum usually without a black spot, at most with narrow basal-lateral basal spots (Fig. 73)	30
30. Wing with 4 inconspicuous crossbands (Fig. 30)	<i>Ter. nigronota</i>
- Wing with distinct pattern or crossbands (Fig. 31, 32, 33)	31
31. Wings pattern not linear projection (Fig. 31)	<i>Ter. ruficauda</i>
- Wings pattern linear projection (Fig. 32, 33)	32
32. Dark transverse bands of wings between R ₄₊₅ and M displaced over apex of wings (Fig. 32)	<i>Ter. quadratula</i>
- Pattern of wings not displaced over apex of wings (Fig. 33)	<i>Ter. gynaechochroma</i>
33. Body in yellowish color	<i>Xyphosia miliaria</i>
- Body in blackish color	34
34. Apical of wings completely black (Fig. 35)	<i>Oxyaciura tibialis</i>
- Apical of wings not completely black and with hyaline areas (Fig. 36 to 50)	35

35. With three pairs of frontal setae (Fig. 56)	<i>Heringina gutatta</i>
- With two pairs of frontal setae (Fig. 57 to 60)	4
36. Proboscis geniculate (Fig. 57)	<i>Campiglossa loewiana</i>
- Proboscis not geniculate (Fig. 58, 59, 60)	5
37. With one pairs of scutellar setae (Fig. 74)	6
- With two pairs of scutellar setae (Fig. 75, 76)	7
38. Vein CuA ₁ with a brown stripe along it from dm-cu to hind margin of wing (Fig. 38).....	
.....	<i>Trupanea amoena</i>
- Vein CuA ₁ entirely with a hyaline areas (Fig. 39)	<i>Tr. Stellata</i>
39. Frons convex above eyes (Fig. 59)	<i>Euaresta bullans</i>
- Frons not convex above eyes (Fig. 60)	8
40. Apical fork of wing absent, only isolated brown or black spots present at end of vein R ₄₊₅ and M (Fig. 41 to 44)	41
- Apical fork of wing present (Fig. 45 to 50)	44
41. Hyaline areas in cell dm small than black areas (Fig. 41)	<i>Tephritis formosa</i>
- Hyaline areas in cell dm more than black areas (Fig. 42, 43, 44)	10
42. Hyaline areas in cell r ₄₊₅ small than black areas (Fig. 42)	<i>Tephritis bardanae</i>
- Hyaline areas in cell r ₄₊₅ more than black areas (Fig. 43, 44)	11
43. With three separate hyaline areas in cell r ₄₊₅ (Fig. 43)	<i>Tephritis postica</i>
- With more than three separate hyaline areas in cell r ₄₊₅ (Fig. 44)	<i>Tephritis hyoscyami</i>
44. Hyaline areas not pent in black areas (Fig. 45)	<i>Tephritis cometa</i>
- Hyaline areas pent in black areas (Fig. 46 to 50)	13
45. Cell m of wing with three separate hyaline areas (Fig. 46)	<i>Tephritis hurvitzi</i>
- Cell m of wing with more than three separate hyaline areas (Fig. 47 to 50)	14
46. With four separate hyaline areas in cell r ₄₊₅ (Fig. 47)	<i>Tephritis oedipus</i>
- With more than four separate hyaline areas in cell r ₄₊₅ (Fig. 48, 49, 50)	15
47. Hyaline areas in cell dm not wide (Fig. 48)	<i>Tephritis praecox</i>
- Hyaline areas in cell dm wide (Fig. 49, 50)	16
48. Cell cup completely hyaline, except in tension to apical of wings (Fig. 49)	
.....	<i>Tephritis dioscurea</i>
- Cell cup not completely hyaline (Fig. 50)	<i>Tephritis nigricauda</i>

LITERATURE CITED

- Baugnee, J. Y.** 2006. Contribution à la connaissance des Tephritidae de Belgique (Diptera: Brachycera). Notes fauniques de Gembloux. 59 (2): 63-113.
- Dirlbek J.** 1980. Ergebnisse der tschechoslowakischen Expedition des Nationalmuseums in Prag nach Iran (Diptera: Tephritidae). Acta Univ. Carol. Biol., P. 269-274.
- Fraunfeld, G. R.** 1857. Beitrage zur Naturgeschichte der Trypeten nebst Beschreibung einiger neuer Arten. Sitzungsber. Akad. Wiss. (22): 523-557.
- Foote, R. H.** 1984. Family Tephritidae, In: A. Soos and L. Papp eds., Catalogue of Palaearctic Diptera (ed., R. C. Foote). Budapest and Elsevier Science Publishers, Amsterdam, (9): 66-149.

- Freidberg, A. & Kugler, J.** 1989. Fauna Palaestina Insecta IV. Diptera: Tephritidae. Israel at Keterpress Enterprises, Jerusalem, 212 pp.
- Giray, H.** 1979. Türkiye Trypetidae (Diptera) faunasına ait ilk liste. Türkiye Bitki Koruma Dergisi, 3 (1): 35-46.
- Gharajedaghi Y., Khaghaninia, S., Zarghaninia, E. & Farshbaf Pour Abad, R.** Some of fruit flies fauna (Diptera: Tephritidae) of East Azarbaijan province including a key for the species, Journal of Plant Protection, in press.
- Gharajedaghi, Y., Khaghaninia, S., Farshbaf Pour Abad R. & Kutuk, M.** 2011a. Identification of fruit flies (Diptera: Tephritidae) of Ecebsir region including a new record for the Iran fauna, Proceedings of the 5th Turkish Plant Protection Congress, P. 36.
- Gharajedaghi Y., Khaghaninia, S., Farshbaf Pour Abad, R. & Kutuk, M.** 2011b. Study of the genus *Urophora* Robineau-Desvoidy, 1830 (Diptera: Tephritidae) in Ecebsir region with two species as new records for Iran, Mun. Ent. Zool., 6 (1): 358- 362.
- Gharali, B., Merz, B. & Lotfalizadeh, H. D.** 2005. Report of *Urophora terebrans* (Loew, 1850) (Diptera: Tephritidae) on *Centurea* from Iran. Entomology and Phytopathology, 72 (2): 39-39.
- Gilasian, E. & Merz, B.** 2008. The first report of three genera and fifteen species of Tephritidae (Diptera) from Iran. Journal of Entomological Society of Iran, (27): 11-14.
- Hendel, F.** 1927. Trypetidae. In: Die Fliegen der Palaearktischen Region. (Ed. E. Lindner) Schweitzerbart Oschen Verlagsbuchhandlung, Stuttgart, Vol. 5.
- Karimpoor Y. & Merz B.** 2006. The first report of *Urophora quadrfasciata* and *Urophora xanthippe* (Dip. Tephritidae) from Iran Proceedings of the 17th Iranian plant protection congress, P. 73.
- Khouzama, M. K., Kalash, S. M. & White, I. M.** 2002. Flowerhead infesting fruit flies (Diptera: Tephritidae) on thistles (Asteraceae). Lebanon Journal of Natural History, (36): 617-629.
- Korneyev, V. A.** 2006. A revision of the *quadratula* group of the genus *Terellia* Robineau-Desvoidy (Diptera: Tephritidae) Isr. J. Entomol. Biotaxonomy of Tephritoidea, Ed. A. Freidberg. P. 341-366.
- Korneyev, V. A. & Dirlbek, J.** 2000. The fruit flies (Diptera: Tephritidae) of Syria, Jordan and Iraq. StudiaDipterologica, (7): 463-482.
- Korneyev, S. V. & Konovalov S. V.** 2010. Review of the fruit-flies (Diptera: Tephritidae) of Lugansk Region (Ukraine). Summary. 1 (2): 35-38.
- Korneyev, V. A. & White, I. M.** 1999. Fruit flies of genus *Urophora* R-D. (Diptera: Tephritidae) of east palaeartic. III. Key to species. Ent, Obozr., 78 (2): 464-482.
- Kutuk, M.** 2003. Doğu Akdeniz Bölgesi *Urophora* Robineau-Desvoidy (Diptera: Tephritidae) faunası ve sistematiki üzerine araştırmalar. Türkiye Entomoloji Dergisi, 27: 149-160.
- Kutuk, M.** 2006. A new species of *Urophora* Robineau-Desvoidy, 1830 (Diptera: Tephritidae) from Turkey, with a key to the species of the *Urophora quadrfasciata* group. Turk. J. Zool., (30): 147-153.
- Kutuk, M. & Ozgur, A. F.** 2003. Faunistical and systematical studies on the genus *Tephritis* Latreille, 1804 (Diptera: Tephritidae) in the South West of Turkey along with new records. Turk. Entomol. Derg. (27): 243-252.
- Merz, B.** 1994. Insecte Helvetica Fauna 10. Herausgegeben von der Schweizerischen Entomologischen Gesellschaft. Diptera Tephritidae, Hge. Geneve, 198 pp.
- Merz B.** 2008. Order Diptera, family Tephritidae, Arthropod fauna of the UAE, Ed. A. Van Harten Dar Al Ummah Printing Publishing, Distribution and Advertising, Abu Dhabi, P. 643-661.
- Merz, B. & Dawah, A.** 2005. Fruit flies (Diptera, Tephritidae) from Saudi Arabia, with descriptions of a new genus and six new species, Revue Suisse De Zoologie, 112 (4): 983-1028.
- Merz, B. & Korneyev, V. A.** 2004. Fauna Europea: Tephritidae In Pape, T. (ed.). Fauna Europea: Diptera, Brachycera. Fauna Europea version 1.1, <http://www.faunaeur.org>.

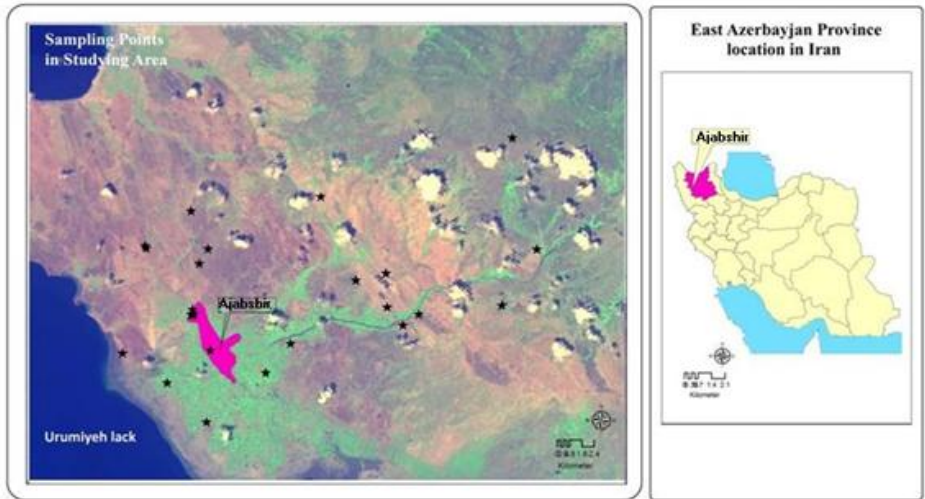
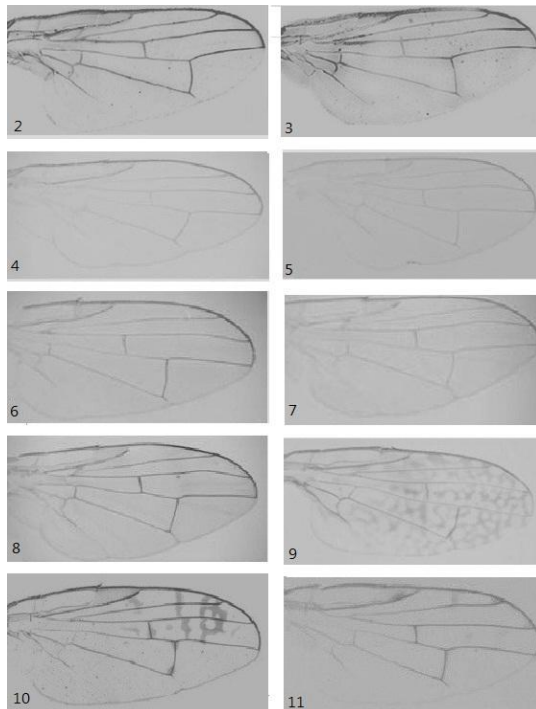
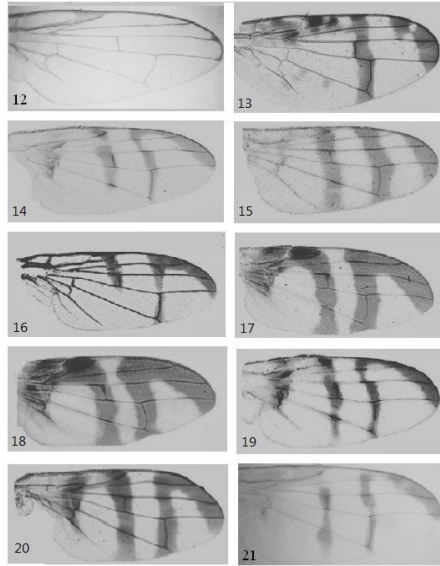


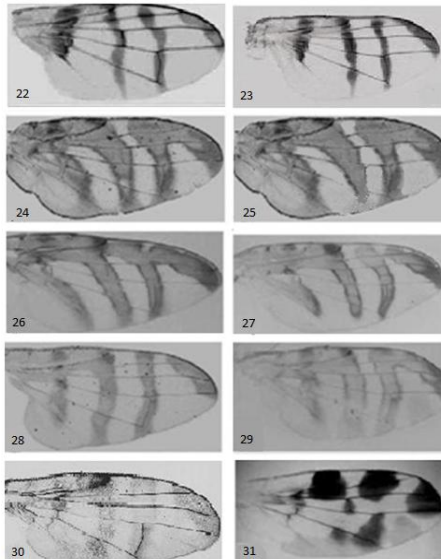
Figure 1. Location of sampling points on satellite image (SPOT) of Ajabshir region.



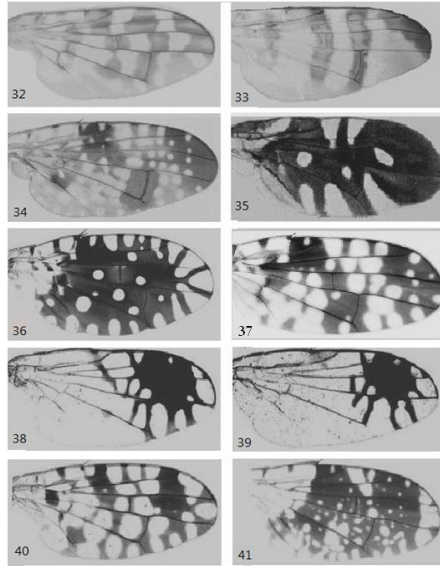
Figures 2-11. Wings of fruit flies: 2- *Urophora hermonis*, 3- *U. impicta*, 4- *Terellia luteola*, 5- *T. virens*, 6- *Ter. uncinata*, 7- *Ter. foscicornis*, 8- *Terellia serratulae*, 9- *Tephritomyia lauta*, 10- *Acanthiophilus helianthi*, 11- *Ensina sonchi* (Original).



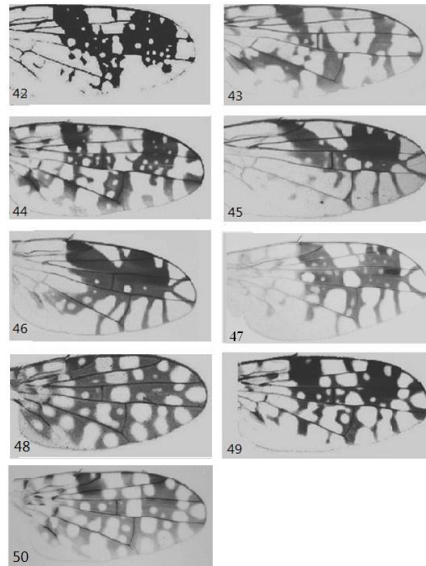
Figures 12-21. Wings of fruit flies: 12- *Terellia colon*, 13- *Sphenella marginata*, 14- *Urophora solaris*, 15- *U. affinis*, 16- *U. stylata*, 17- *U. doganlari*, 18- *U. quadrifasciata*, 19- *U. jaceana*, 20- *U. mauritanica*, 21- *U. stalker* (Original).



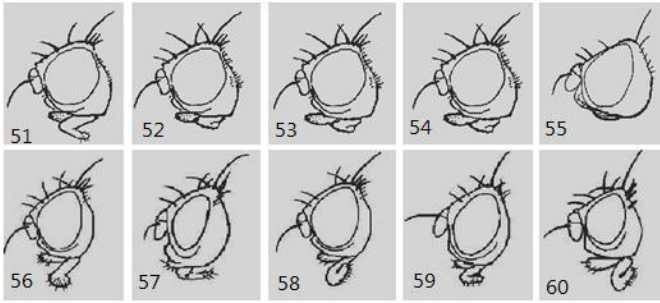
Figures 22-31. Wings of fruit flies: 22- *Urophora solstitialis*, 23- *U. terebrans*, 24- *Chaetorellia jaceae*, 25- *Chaetorellia australis*, 26- *Orellia stictica*, 27- *O. falcata*, 28- *O. distans*, 29- *Chaetostomella cylindrica*, 30- *Terellia nigronota*, 31- *Ter. ruficauda* (Original).



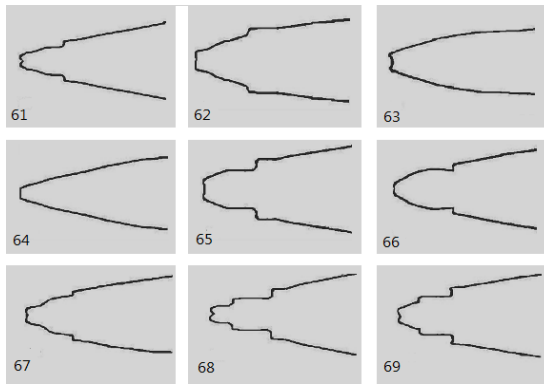
Figures 32-41. Wings of fruit flies: 32- *Terellia quadratula*, 33- *Ter. gynaecochroma*, 34- *Xyphosia miliaria*, 35- *Oxyaciura tibialis*, 36- *Heringina gutatta*, 37- *Compiglossa loewiana*, 38- *Trupanea amoena*, 39- *Tru. Stellata*, 40- *Euaresta bullans*, 41- *Tephritis formosa* (Original).



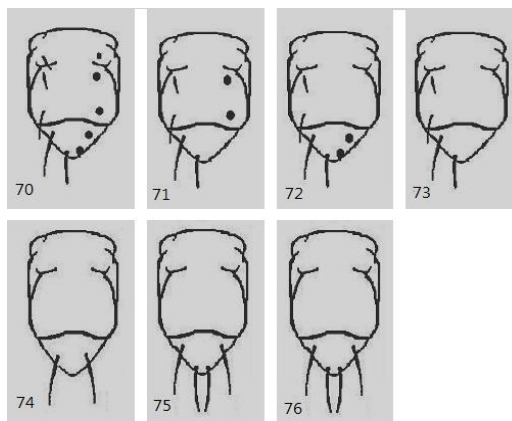
Figures 42-50. Wings of fruit flies: 42- *Tephritis bardanae*, 43- *T. postica*, 44- *T. hyoscyami*, 45- *T. cometa*, 46- *T. hurvitzii*, 47- *T. oedipus*, 48- *T. praecox*, 49- *T. dioscurea*, 50- *T. nigricauda* (Original).



Figures 51-60. Head of fruit flies: 51- *Urophora* spp., 52- *Terellia uncinata*, 53- *Ter. fuscicornis*, 54- *Ter. serratulae*, 55- *Ensina sonchi* : 56- *Heringina* spp., 57- *Compiglossa* spp., 58- *Trupanea* spp., 59- *Euaresta* spp., 60- *Tephritis* spp. (Lateral view; drawing).



Figures 61-69. Aculeus of genus *Urophota*: 61- *U. affinis*, 62- *U. stylata*, 63- *U. doganlari*, 64- *U. quadrifasciata*, 65- *U. jaceana*, 66- *U. mauritanica*, 67- *U. stalker*, 68- *U. solatitialis* 69- *U. terebrans* (dorsal view; drawing).



Figures 70-76: Tergum of fruit flies: 70- *Chaetorella* spp., 71- *Orellia* spp., 72- *Chaetostomella cylindrica*, 73- *Terellia* spp., 74- *Trupanea* spp., 75- *Euaresta bullans* 76- *Tephritis* spp., (dorsal view; drawing).