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THE FRUIT FLIES OF MOROCCO: NEW RECORDS OF THE TEPHRITINAE (DIPTERA, TEPHRITIDAE)

Y. El Harym[1], B. Belqat[1], V. A. Korneyev[2,3]

[1]*Department of Biology, Faculty of Sciences,*
University Abdelmalek Essaâdi, Tétouan, Morocco
E-mail: elharym.younes@gmail.com
E-mail: belqat@gmail.com
[2]*Schmalhausen Institute of Zoology NAS of Ukraine,*
vul. B. Khmelnytskogo, 15, Kyiv, 10030 Ukraine
E-mail: valery.korneyev@gmail.com
[3]*Corresponding author*

Y. El Harym (https://orcid.org/0000-0002-6852-6602)
B. Belqat (https://orcid.org/0000-0003-2857-7699)
V. A. Korneyev (https://orcid.org/0000-0001-9631-1038)

The Fruit Flies of Morocco: New Records of the Tephritinae (Diptera, Tephritidae). El Harym, Y., Belqat, B. & Korneyev, V. A. — Based on the samples of true fruit flies belonging to the subfamily Tephritinae collected in Morocco during 2016–2020, the genus *Chaetostomella* Hendel, 1927 and the species *Myopites cypriaca* Hering, 1938, *M. longirostris* (Loew, 1846), *Tephritis carmen* Hering, 1937 and *Urophora jaculata* Rondani, 1870 are recorded for the first time in North Africa and *Chaetorellia succinea* Costa, 1844, *Chaetostomella cylindrica* Robineau-Desvoidy, 1830, *Terellia luteola* (Wiedemann, 1830), *Terellia oasis* (Hering, 1938) and *Urophora quadrifasciata algerica* (Hering, 1941) are new records for the Moroccan fauna. The occurrence of *Capitites ramulosa* (Loew, 1844), *Tephritis simplex* Loew, 1844 and *Aciura coryli* (Rossi, 1794) are confirmed. Host plants as well as photos of verified species are provided.
Key words: Tephritidae, Tephritinae, Morocco, Middle Atlas, Rif, new records, host plants.

Introduction

The world fauna of true fruit flies (Tephritidae) includes over 4700 species in more than 492 genera (Pape et al., 2011); of them at least 267 species are recorded from Europe (Merz & Korneyev, 2004).

The tephritid fauna of Morocco was studied previously by Wiedemann (1824), Becker & Stein (1913) and Séguy (1930, 1934, 1941, 1949, 1953). Currently, these data have been summarized by El Harym & Belqat (2017), who listed 59 species recorded from Morocco along with new records of several species collected in 2013–2016, with confirmation of some species identifications by S. Korneyev (2016).

Material and methods

The material was collected by sweep netting or reared from flower heads of asteraceous plants during 2016–2020, at twenty sites (listed in table 1) in the Rif, the Oriental region and the Middle Atlas areas (fig. 1). The flies were killed by freezing and then stored in 96 % alcohol. All the photographs were taken through the eyepiece of a binocular microscope with Samsung J1 smartphone camera.

The identification of species was primarily based on the keys by Hendel (1927), White (1988), White & Korneyev (1989), White & Marquardt (1989), Freidberg & Kugler (1989) and Merz (1994) and then confirmed by V. Korneyev based on detailed studies of photographs sent by e-mail. The tribes, genera and species are listed in alphabetic order. The specimens are deposited in the Diptera Collection of the Faculty of Sciences, University Abdelmalek Essaâdi, Tétouan, Morocco.

Results

Among the 574 specimens collected (283 males and 291 females), twelve species belonging to nine genera of the subfamily Tephritinae were identified.

Of these, four species (*Myopites cypriacus* Hering, 1938, *M. longirostris* (Loew, 1846), *Tephritis carmen* Hering, 1937 and *Urophora jaculata* Rondani, 1870) are recorded for the first time from North Africa. Five species identified are recorded for the first time from Morocco (*Chaetorellia succinea* Costa, 1844, *Chaetostomella cylindrica* Robineau-Desvoidy, 1830, *Terellia luteola* (Wiedemann, 1830), *Terellia oasis* (Hering, 1938) and *Urophora quadrifasciata algerica* (Hering, 1941)), plus three species — *Aciura coryli* (Rossi, 1794), *Capitites ramulosa* (Loew, 1844) and *Tephritis simplex* (Loew, 1844) — *that* have not been recorded otherwise from Morocco since Séguy (1930, 1941, 1949, 1953) and are recorded additionally for the first time from the Rif region.

Table 1. Sampling sites (in alphabetical order) harbouring the species collected in Morocco (as shown on fig. 1)

Site	Province	Locality	Altitude (m)	Geographical coordinates (decimal)
		Rif		
Aforidane	Tétouan	Ifartane, Beni Leit (Beni Hassane)	752	35.311317, -5.398600
Aïn El Maounzil	Chefchaouen	Bab Taza (Talassemtane park)	1106	35.076283, -5.173433
Aïn Siyed	Tétouan	Ifartane, Beni Leit (Beni Hassane)	773	35.300717, -5.382317
Aïn Soualah	Tétouan	Douar Souhnane	719	35.483633, -5.314217
Amsa vicinity	Tétouan	Amsa	90	35.533000, -5.213917
Arhil	Tétouan	Beni Hassan	1275	35.329617, -5.313183
Dam Nakhla	Tétouan	Zinat	323	35.447283, -5.388950
Douar Kitane	Tétouan	Zaitoune Rural Commune	52	35.540200, -5.339883
Douar Kouf	Al Alyiyene (Allyene)	M'diq-Fnideq	77	35.726600, -5.408617
Forest house	Chefchaouen	National Park of Talassemtane	1674	35.134600, -5.137700
Koudiat Tayfor	Mdiq-Fnideq	Cabo Negro	121	35.684417, -5.280983
Marabout Douar Halila	Tétouan	Douar Halila	92	35.522350, -5.290517
Marabout Sidi Bou Hadjel	M'diq-Fnideq	Restinga	7.5	35.787717, -5.361583
Mkhinak	Tétouan	Douar Chourdane (Jbel Bouzaitoune)	908	35.479433, -5.322233
Oued Tahaddart	Tangier	Houara	1	35.586467, -5.987117
		Oriental		
Bakrim	Nador	Zaïo	139	34.931833, -2.734800
		Middle Atlas		
Douar Oulad Abdoune	Fqih Bensalah	Krifate municipality	433	32.483967, -6.701750
Douar Oulad Amar	Sidi Kacem	Dar Gueddari (Khmiss Rmila)	14	34.416150, -6.101383
Mlakite	Sidi Slimane	Douar Baggara	22	34.336117, -5.848333
Tihli	Sidi Slimane	M'saada municipality	22	34.395200, -5.840250
Tirra	Sidi Slimane	Douar Baggara	19	34.342967, -5.864667

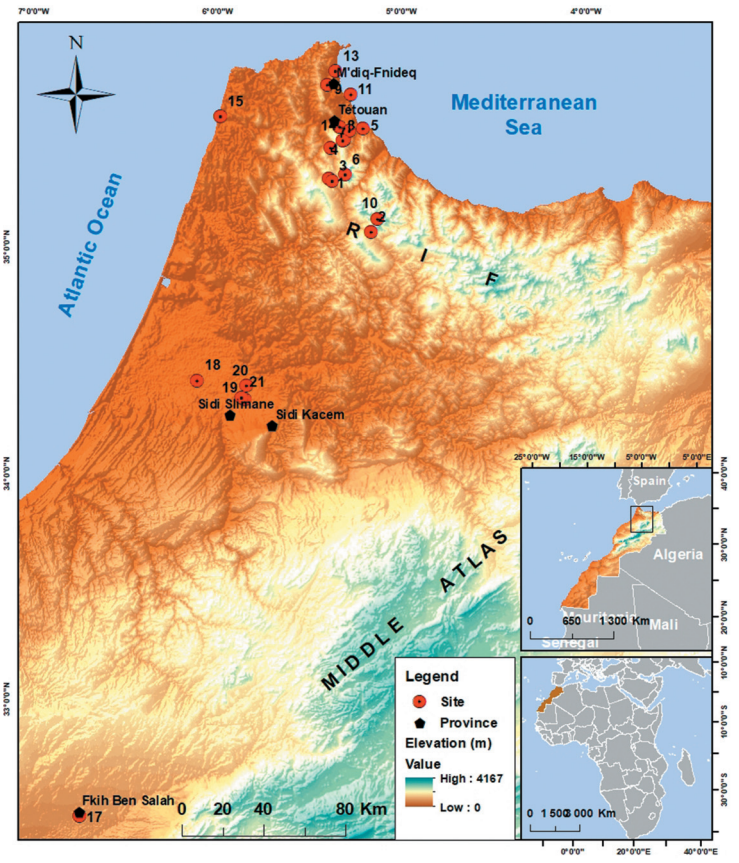

Fig. 1. Map of collecting sites (as listed in table 1).

Ten host plants are listed as follows: *Carthamus lanatus* L., *Centaurea aspera* L., *Centaurea calcitrapa* L., *Cynara cardunculus* L., *Dittrichia graveolens* L, *Limbarda crithmoides* subsp. *longifolia* (Arcang.) Greuter., *Mantisalca salmantica* (L.) Briq. & Cavill., *Phagnalon saxatile* (L.) Cass., *Ptilostemon rhiphaeus* (Pau & Font Quer) Greuter. and *Pulicaria odora* (L.) Rchb. In some cases, other host plants have been listed from previously published sources.

Subfamily Tephritinae Newman, 1834
Tribe Myopitini Hendel, 1927
Myopites Blot, 1827

A detailed review of the genus is given by Korneyev (in press). Identification of species and the key are based on that work.

Key to West European and North African species of *Myopites* (adopted from Korneyev, in press)

1. Scutellum, male abdomen and female oviscape always entirely black. Female abdominal tergites black except lateral and posterior margins yellow. WL~2.7. Larvae in galls on *Schizogyne sericea* and *Phagnalon rupestre* (Gnaphalieae) (Merz, 1991). Canary Is. .....*Myopites nigrescens* Becker
— Scutellum, and usually male abdomen and female oviscape partially yellow; if oviscape black then either scutellum yellow or, if rarely both scutellum and female oviscape entirely black (in 2–3 % of *M. longirostris*), then aculeus with cercal unit tuberculate. 2
2. Mesonotal scutum (as well as scutellum and pleura) mostly yellow; oviscape entirely yellow except apex very narrowly black, longer than abdomen. Wing greyish, with wide pale brown marks. Aculeus apex smooth. Larvae in *Dittrichia viscosa*, forming ovate dark galls. Southern Europe; Israel; Morocco. ....*Myopites stylatus* (Fabricius)

— Scutum widely black under microtrichia. If mesonotal scutum yellow at sides (in *M. apicatus*) then oviscape shorter than abdomen and with dark basal area. If oviscape longer than abdomen (in *M. inulae*) then entirely black without yellow marks [Other characters variable].

3. Katepisternum (at least in dorsal one-third) and whole anepisternum yellow. Oviscape yellow, black in antero-dorsal half and apical 1/6 [Oviscape shorter than abdomen; aculeus apex mostly or entirely smooth]....4

— Anepisternum ventrally and whole katepisternum black [Oviscape longer or shorter than abdomen; aculeus apex smooth or tuberculate]. 5

4. Wing bands pale brown. Preapical crossband along vein R_{4+5} usually as wide as or wider than hyaline space between it and apical mark, if narrower then katepisternum mostly yellow. Vein M_1 slightly bowed posteriorly at the very apex and reaching costa nearly at wing apex. Cercal unit of aculeus with a few tubercles at apices of pores. Larvae in galls on *Pulicaria dysenterica*. Palaearctic Region: Central and Western Europe, Balkans; Asia Minor; Near East..... *Myopites apicatus* Freidberg

— Wing bands dark brown, contrasting. Preapical crossband along vein R_{4+5} narrower than hyaline space between it and apical dark mark, if wider then katepisternum ventrally black. Vein M_1 reaching costa far anterior of wing apex, apically non-parallel to R_{4+5}. Cercal unit of aculeus smooth (figs 2, *f–g*). Larvae in galls on *Dittrichia graveolens* and *Pulicaria arabica*. Palaearctic Region: Spain, Cyprus; Israel, Turkey; Morocco. .....*Myopites cypriacus* Hering (specimens with paler pleura)

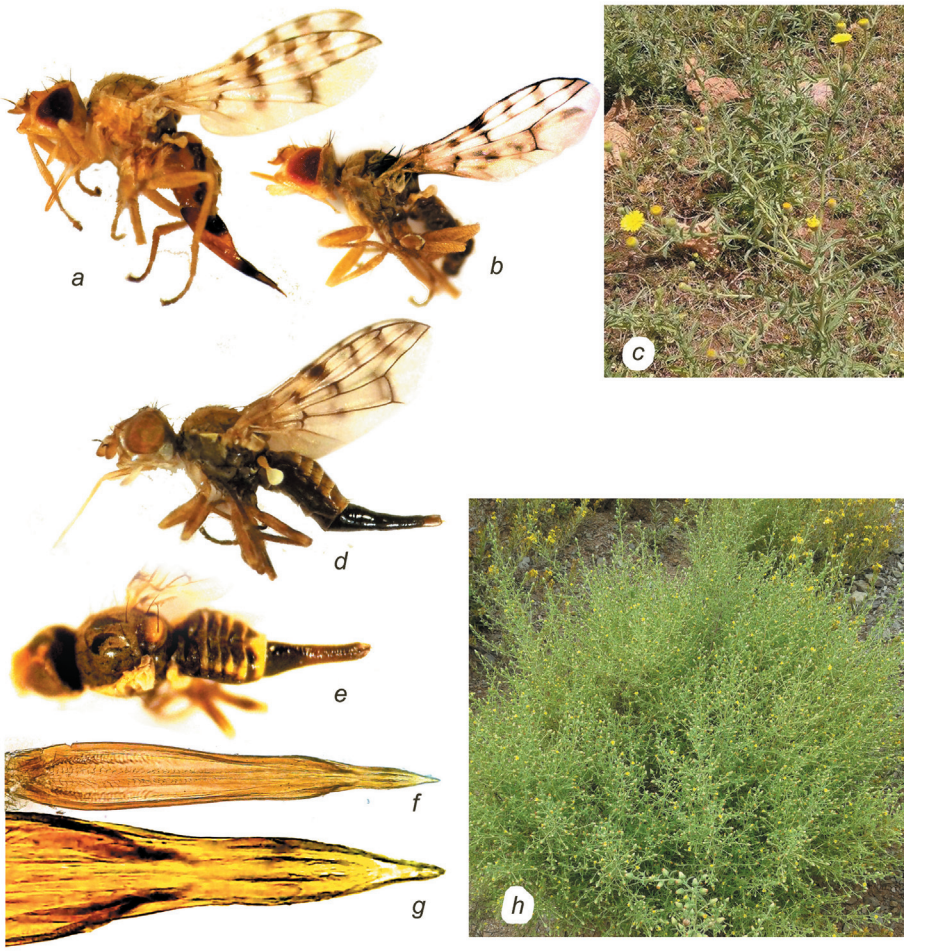

Fig. 2. *Myopites cypriacus* (*a–b, d–g*) and its host plants (*c, h*): *a–c* — from *Pulicaria arabica*, *d–h* — from *Dittrichia graveolens*: *a, e–h* — female; *b* — male; *f* — aculeus, *g* — its apex, enlarged.

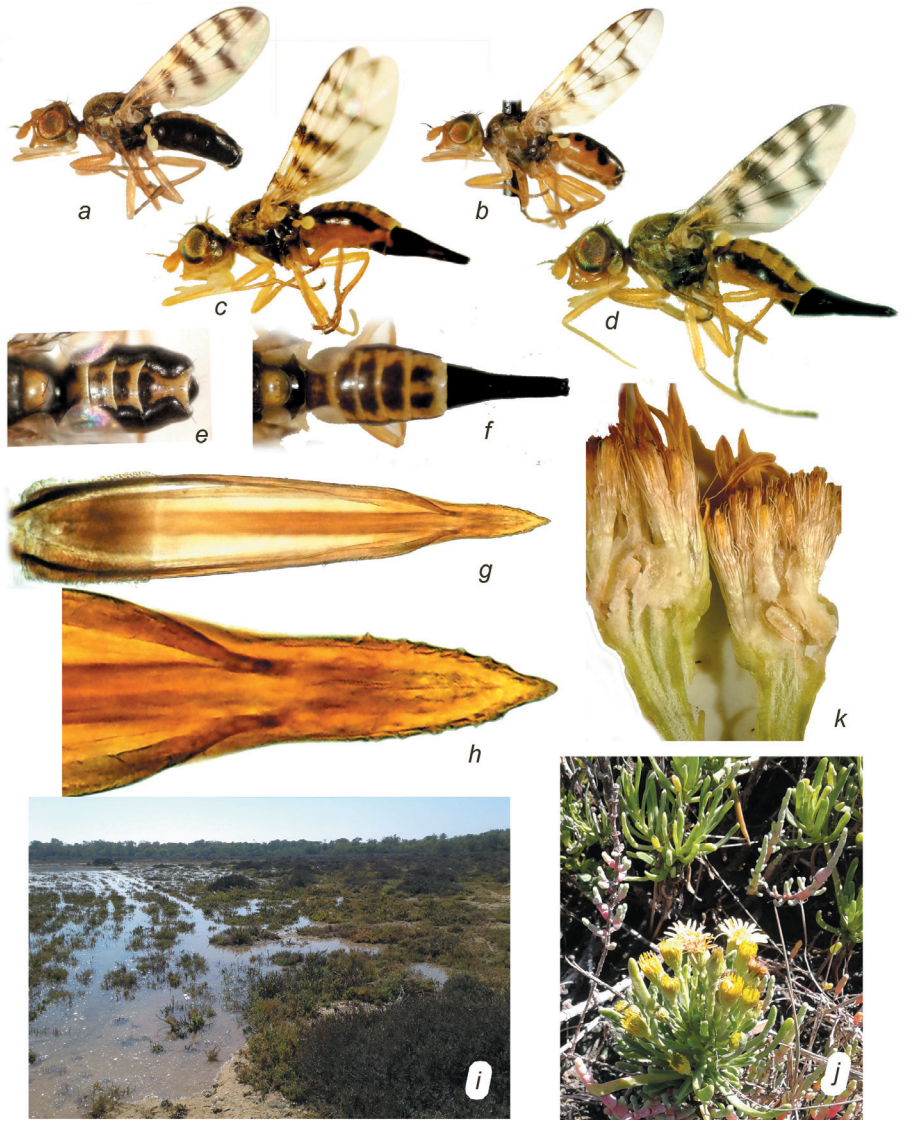

Fig. 3. *Myopites longirostris* from *Limbarda crithmoides* subsp. *longifolia*: *a–f* — adult insects, showing variability of body and wing pattern (*a–d* — habitus, lateral view, *e–f* — abdomen; *a, b, e* — male, *c, d, f* — females); *g* — aculeus, *h* — its apex, enlarged; *i* — coastal salty marsh with *j* — *L. crithmoides,* host plant; *k* — 2nd instar larva of *M. longirostris* in the flower head of *L. crithmoides*.

5. Wing: preapical crossband along vein R_{4+5} wider than hyaline space between it and apical mark, if as wide as hyaline space then oviscape longer than abdomen and black. Larvae in flowerhead galls on *Pentanema hirtum* and *P. salicinum*. Central and Eastern Europe (Switzerland to Russia), Caucasus .... *Myopites inulae* (von Roser)

— Wing: preapical crossband along vein R_{4+5} narrower than hyaline space between it and apical mark, if as wide as hyaline space then oviscape shorter than abdomen; either oviscape widely yellow at middle or aculeus apically tuberculate.....6

6. Anepisternum widely black ventrally. Cercal unit of aculeus tuberculate (figs 3, *g–h*, 4, *c–d*). Larvae in galls on *Limbarda crithmoides* and *Pulicaria odora*. Atlantic and Mediterranean coasts (England, France, Portugal. Morocco to Croatia). ..... *Myopites longirostris* Loew

— Anepisternum yellow, if black ventrally then cercal unit of aculeus smooth (figs 3, *f–g*). Larvae in galls on *Dittrichia graveolens, Pulicaria arabica* and *P. sicula*. Eastern Mediterranean coasts; Cyprus, Israel, Turkey; Morocco. ..... *Myopites cypriacus* Hering (specimens with darker pleura)

Myopites cypriacus Hering 1938 (fig. 2)

Material examined. Rif : Douar Halila, reared from *Dittrichia graveolens* L., 22.12.2018, 1 ♂, 2 ♀; 25.12.2018, 2 ♀; 27.12.2018, 1 ♂; 29.12.2018, 1 ♀; 2 ♂, 10.02.2019, 1 ♀; 01.03.2019, 4 ♂, 1 ♀ (El Harym). Dam Nakhla, 1 ♂, 08.02.2019; 5 ♂, 1 ♀, 01.03.2019; 4 ♂, 3 ♀, 06.03.2019; 12 ♂, 4 ♀, 08.03.2019; 9 ♂, 6 ♀, 18.03.2019; 18 ♂, 17 ♀, 01.04.2019 (El Harym). Marabout Sidi Bou Hadjel, reared from *Pulicaria arabica* L., 10.06.2019, 1 ♀ (El Harym).

Host plants. In this study, *Dittrichia graveolens* (L.) (fig. 2, *c*) and *Pulicaria arabica* (L.) Cass. Desf. (fig. 2, *h*), plus *P. sicula* (Dirlbek, 1974, Freidberg, 1979, Freidberg & Kugler, 1989). Record of *Centaurea iberica* Trevir. & Spreng. (Bayrak & Hayat, 2012) is an error.

Distribution. Italy, Cyprus; Israel (Norrbom et al., 1999); Turkey (Bayrak & Hayat, 2012; Koçak and Kemal 2013); Morocco (**first record**). First record for North Africa.

Myopites longirostris (Loew, 1846) (figs 3–4)

Material examined. Rif : Oued Tahaddart, reared from *Limbarda crithmoides longifolia*, 26.08.2019, 4 ♀; 29.01.2020, 1 ♀; 03.02.2020, 2 ♂, 2 ♀; 11.02.2020, 1 ♂, 3 ♀; 17.02.2020, 3 ♂; 23.02.2020, 1 ♂, 26.02.2020, 1 ♀; 1 ♀; 02.03.2020, 1 ♀ (El Harym); Douar Kouf, reared from *Pulicaria odora*, 21.05.2019, 3 ♂, 3 ♀; 22.05.2019, 23 ♂, 8 ♀; 23.05.2019; 37 ♂, 36 ♀, 27.05.2019, 106 ♂, 153 ♀ (El Harym); Mkhinak, net sweeping, 09.06.2019, 1 ♀ (El Harym).

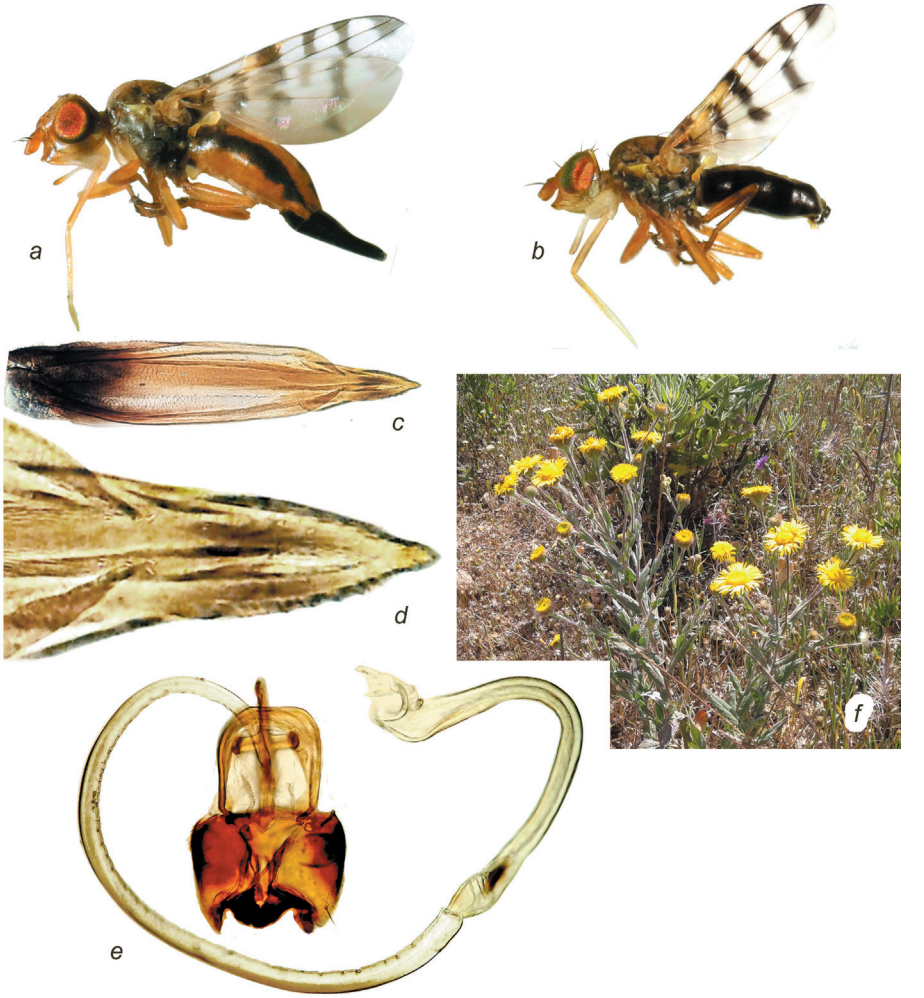

Fig. 4. *Myopites longirostris* from *Pulicaria odora*: *a* — female, habitus, lateral view; *b* — male, habituslateral view; *c* — aculeus, *d* — its apex, enlarged; *e* —male genitalia, ventral; *f* — host plant.

Host plants. In this study specimens were reared from *Limbarda crithmoides* subsp. *longifolia* (Arcang.) Greuter (fig. 3) and *Pulicaria odora* (**new host plant**) (fig. 4). Larvae induce almost woody galls in receptacles of *Limbarda crithmoides* (L.) Dumort (Hendel, 1927; Séguy, 1934).

Distribution. Bulgaria, Croatia, France (mainland), Italy (mainland, Sardinia, Sicily), Malta, Spain (Balearic Is.), United Kingdom; Morocco (**first record**). First record from North Africa.

Urophora Robineau-Desvoidy, 1830
Urophora jaculata Rondani, 1870 (fig. 5)

Urophora mauritanica: El Harym & Belqat, 2017: 149 (misidentification).

Host plants. *Urophora jaculata* infests *Centaurea solstitialis* in Italy and mainland Greece and has been swept from other species of the subgenus *Centaurea* (*Solstitiaria*) (Cardueae) (White & Korneyev, 1989).

Distribution. Italy, Greece (White & Clement, 1987; White & Korneyev, 1989). Records from Turkey and Caucasus (Norrbom et al., 1999) are based on misidentifications of *U. sirunaseva* (Hering) (Korneyev & White, 1992). Morocco (**first record**).

Remarks. This species was recorded by El Harym & Belqat (2017) as "*Urophora mauritanica*", but after study of the aculeus was identified as *U. jaculata*.

Urophora quadrifasciata algerica (Hering, 1941) (fig. 6)

Euribia algerica Hering, 1941; *Urophora algerica* (Hering, 1941)

Material examined. Middle Atlas: Douar Oulad Abdoune, 17.05.2017, from *Centaurea aspera*, 05.06.2017, 1 ♀; 1 ♂; Mlakite, 09.06.2017, 1 ♂, 2 ♀; Tirra, 09.06.2017, 3 ♂, 3 ♀; Douar Oulad Amar, 10.06.2017, 1 ♂ (net sweepinp); 12.06.2017, 1 ♀; idem, reared from *Centaurea aspera* L.,16.06.2017, 2 ♀; Tihli, 16.06.2017, 1 ♀; reared from *Centaurea calcitrapa* L., 17.06.2017, 1 ♀; Douar Oulad Amar, reared from *Centaurea aspera* L., 17.06.2017, 1 ♂ (El Harym).

Host plants. In this study, the host plants were *Centaurea aspera* L. and *C. calcitrapa* L. (fig. 6). *Centaurea nicaeensis* All. and possibly other starthistles of the subgenera *Centaurea* (*Seridia* Juss.) and *Centaurea* (*Solstitiaria* Hill.) (Cardueae) also have been recorded (White & Korneyev, 1989).

Distribution. Italy, Southern France, Spain, (White & Korneyev, 1989; Norrbom et al., 1999; Heřman & Dirlbek, 2006). Algeria, Tunisia, Morocco (**first record**).

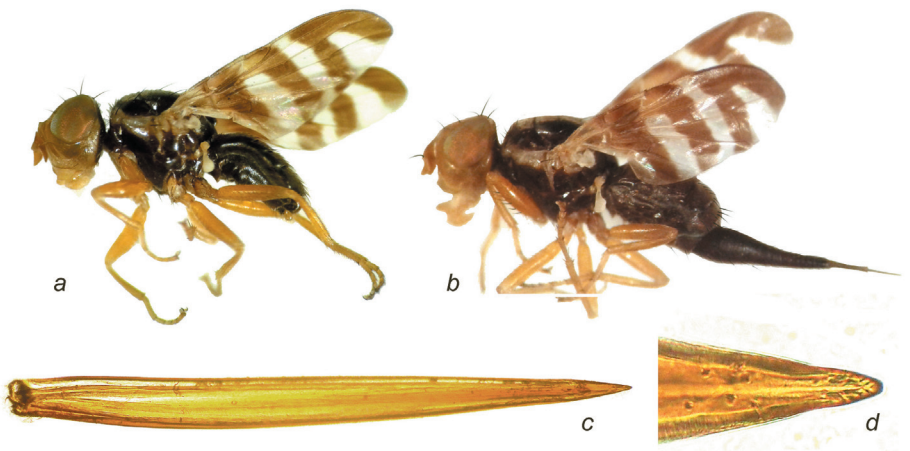

Fig. 5. *Urophora jaculata*: *a* — male, *b* — female habitus, lateral view; *c* — aculeus, *d* — its apex, enlarged.

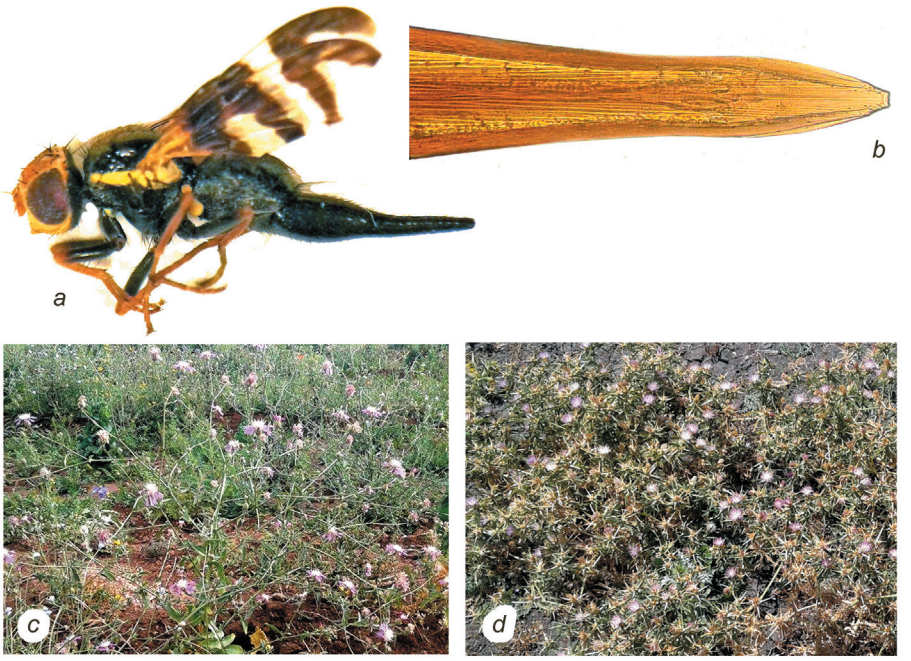

Fig. 6. *Urophora quadrifasciata algerica*: *a* — female habitus, lateral view; *b* — female genitalia, aculeus apex; *d–e* — host plants (*d* — *Centaurea aspera*, *e* — *Ce. calcitrapa*).

Tribe Tephrellini
Aciura Robineau-Desvoidy, 1830
Aciura coryli (Rossi, 1794) (figs 7, *a–b*)

Synonym: *Aciura powelli* Séguy, 1930.

Material examined. Rif: Arhil, 11.07.2020, 1 ♀ (sweeping) (El Harym).

Host plants. In Morocco reared from *Phlomis fruticosa* L. and *Phlomis* sp., (Séguy, 1930). Larvae also develop in the flowers of *Ballota saxatilis* Sieb. ex. C. Presl., *Phlomis viscosa* Poir. (Lamiaceae) (Freidberg & Kugler, 1989) and some other Lamiaceae.

Distribution. From France and Morocco to southern East Europe, Caucasus, Turkey, Israel and Syria (Korneyev & Dirlbek, 2001; Korneyev & Merz, 2004). In Morocco, this species was collected also in the Middle Atlas in Azrou (Séguy, 1930) and in the coastal meseta in Korifla (Séguy 1953).

Tribe Tephritini
Capitites Foote & Freidberg, 1981
Capitites ramulosa (Loew, 1844) (figs 7, *c–d*)

Material examined. Rif: Amsa vicinity, 18.05.2018, 1 ♀; Koudiat Tayfor, reared from *Phagnalon saxatile*, 22.06.2018, 1 ♂, 1 ♀; 25.04.2018, 2 ♀; 28.06.2018, 1 ♂ (El Harym).

Host plants. In this study, *Phagnalon saxatile* (L.) Cass. (fig. 8, b). Freidberg & Kugler (1989) and Merz (1992, 1994) also recorded *Phagnalon rupestre* (L.) DC (Asteraceae: Gnaphalieae) as a host plant.

Distribution. Algeria, Tunisia, Egypt; Croatia, Cyprus, Greece, Portugal (mainland and Cabo Verde), Spain (mainland and Canary Islands); Iraq, Israel, Syria, (Séguy, 1930; Freidberg & Kugler, 1989; Merz 1992; Norrbom et al., 1999; Korneyev & Dirlbek, 2001; Merz & Korneyev, 2004). **Morocco:** Middle Atlas: Forest of Timelilt (Séguy, 1941); High Atlas: Tizi n'Test, Imdress, Taroudant (Séguy 1941); Anti-Atlas: Foum El Hassan, Akka, Agdz, Alnif (Séguy, 1949). First record for Rif.

Tephritis Latreille, 1804
Tephritis carmen Hering, 1937 (fig. 7, *e*)

Material examined. Rif: forest house (sweeping), 04.07.2020, 1 ♂ (El Harym).

Host plant. Larvae induce gregarious galls in *Pseudopodospermum hispanicum* (L.) Zaika, Sukhor. & N.Kilian (= *Scorzonera hispanica* L.) (Cichorieae) flower heads (Merz, 1994; Freidberg & Kütük, 2002).

Distribution. Austria, France, Italy, Spain, Switzerland; Turkey (Merz, 1994; Özgür & Kütük, 2003). Morocco (**first record**). First record from North Africa.

Tephritis simplex (Loew, 1844) (fig. 7, *f*)

Material examined. Rif: Aïn Soualah, 03.06.2018, 1 ♀; Aïn El Maounzil, net sweeping, 05.07.2020, 1 ♂ (El Harym).

Host plants. *Crepis albida* Vill. (Merz, 1994).

Distribution. Algeria, Tunisia; Cyprus, France, Greece (Mainland & Crete), Italy, Portugal, Spain; Israel, Turkey (Norrbom et al., 1999; Merz, 2001; Korneyev, 2016); Morocco (Séguy, 1930).

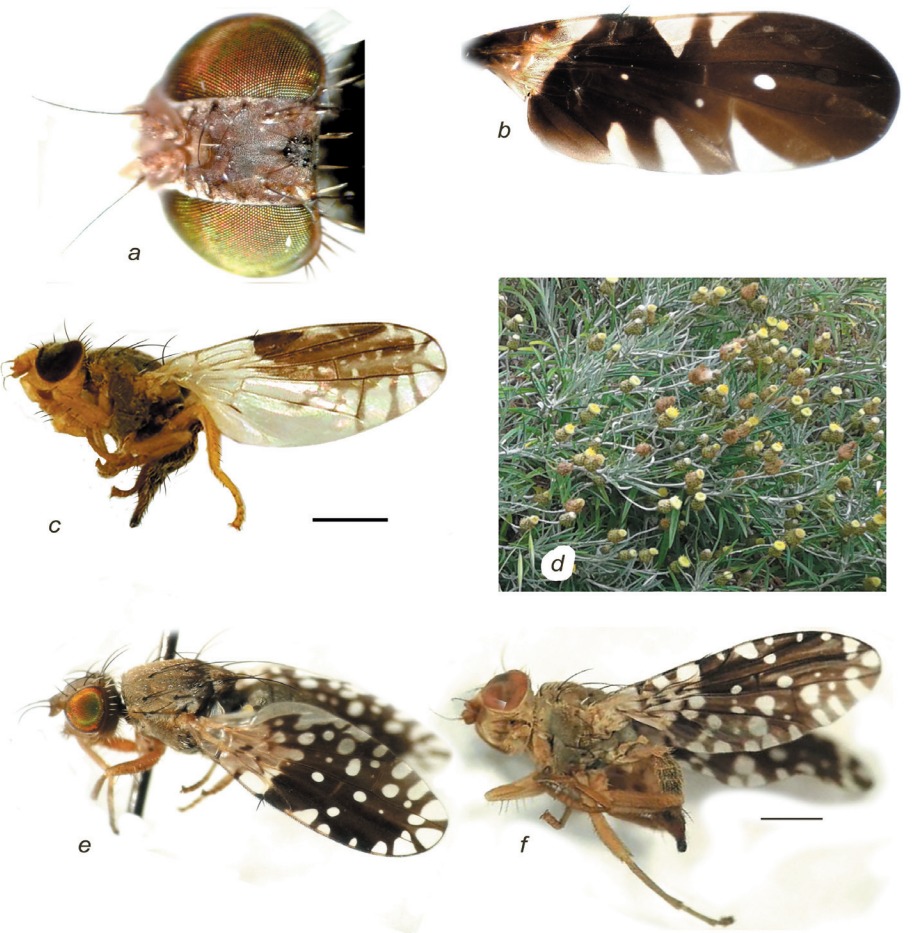

Fig. 7. *Aciura coryli* (*a–b*), *Capitites ramulosa* (*c–d*), *Tephritis carmen* (*e*) and *T. simplex* (*f*): *a* — head, dorsally; *b* — wing; *c, e, f* — habitus, lateral view; *d* — host plant (*Phagnalon saxatile*).

Tribe Terelliini Hendel, 1927
Chaetorellia Hendel, 1927
Chaetorellia succinea (Costa, 1844) (fig. 8)

Material examined. Middle Atlas: Douar Oulad Abdoune, reared from *Centaurea aspera*, 24.05.2017, 1 ♀ (El Harym).

Host plants. *Centaurea solstitialis* L., *Ce. hyalolepis* L. *Ce. pallescens* Delile., and *Ce. idaea* Boiss. & Heldr. (White & Marquart, 1989). Records of *Ce. calcitrapa* L. (Giray 1979) are based on misidentifications of *C. conjuncta* (Becker) (White & Marquardt, 1989). In Morocco, this fly was reared from *Centaurea aspera* L. (fig. 11, c) (**new host plant**).

Distribution. Cyprus, France, Greece (mainland and Crete), Italy, Jordan, Turkey (White & Marquardt, 1989); introduced to USA (Norrbom et al., 1999); record from Iran (Mohamadzade & Korneyev, 2018) needs confirmation; records from "Caucasus" and Egypt are based on misidentifications of *C. conjuncta* (White & Marquardt, 1989); Morocco (**first record**).

Chaetostomella Hendel, 1927
Chaetostomella cylindrica (Robineau-Desvoidy, 1830) aggregation (fig. 9)

Material examined. Rif: Marabout Douar Halila (sweeping), 10.06.2018, 1 ♂, 1 ♀ (El Harym); 24.06.2018, 7 ♂, 2 ♀; 25.06.2018, 7 ♂, 2 ♀; 27.06.2018, 1 ♂, 3 ♀; reared from *Mantisalca salmantica*, 28.06.2018, 2 ♂; Mkhinak, reared from *Ptilostemon rhiphaeus*, 22.07.2019, 1 ♀; reared from *Mantisalca salmantica*, 24.07.2019, 1 ♀; Douar Kitane, reared from *Cynara cardunculus*, 08.02–02.03.2020, 13 ♂, 4 ♀ (El Harym).

Host plants. *Arctium lappa* L., *A. tomentosum* Mill., *Carduus crispus* L., *Ca. nutans* L., *Centaurea bracteata* Scop., *Ce. cyanus* L., *Ce. jacea* L., *Ce. maculosa* L., *Ce. montana* L., *Ce. nervosa* Willd., *Ce. nigra* L., *Ce. nigrescens* Willd., *Ce. scabiosa* L., *Ce. triumfetti* All., *Cirsium acaule* Scop., *Ci. arvense* (L.) Scop., *Ci. eriophorum* (L.) Scop., *Ci. erisithales* (Jacq.) Scop., *Ci. heterophyllum* (L.) Hill., *Ci. oleraceum* (L.) Scop., *Ci. palustre* (L.) Scop., *Ci. rivulare* (Jacq) All., *Ci. tuberosum* (L.) All., *Ci. vulgare* (Ten.) Savi., *Crupina vulgaris* Pers. ex. Cass., *Cynara cardunculus* L., *Mantisalca salmantica* (L.) Briq. & Cavill., *Notobasis syriaca* (L.) Cass., *Onopordum acanthium* L. *O. illyricum* L., *Ptilostemon rhiphaeus* (Pau & Font Quer) Greuter., *Serratula tinctoria* L. (Hendel, 1927; Merz, 1994; Smith et al., 2009).

Remarks. Actual taxonomic status of populations associated with different host plants is unclear (V. Korneyev, unpublished data). Some of the Mediterranean and Middle East populations have been described as separate species (see also: Knio et al. (2007) and Smith et al. (2009) for discussion), but this aggregation of cryptic species, subspecies or host races needs a full taxonomic revision involving more host-plant, morphometric, and genetic evidence.

In this study, *C. cylindrica* was reared from *Mantisalca salmantica* (L.) Briq. & Cavill. (fig. 12, d) (**new host plant**) and also from *Cynara scolymus* L. Here, we consider *C. cylindrica* as an unrevised aggregation of host races or cryptic species.

Distribution. Most of Europe (Merz & Korneyev, 2004), North Africa (Algeria, Tunisia) (Heřman & Dirlbek, 2006), Morocco (**first record of genus and species**); Iran (Khaghaninia et al., 2012; Mohamadzade Namin & Korneyev, 2016), Jordan, Kazakhstan, Turkey, Lebanon & Afghanistan; China.

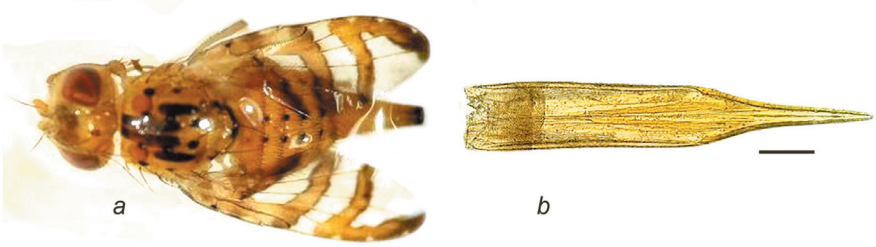

Fig. 8. *Chaetorellia succinea*: *a* — female habitus, dorsal view; *b* — aculeus.

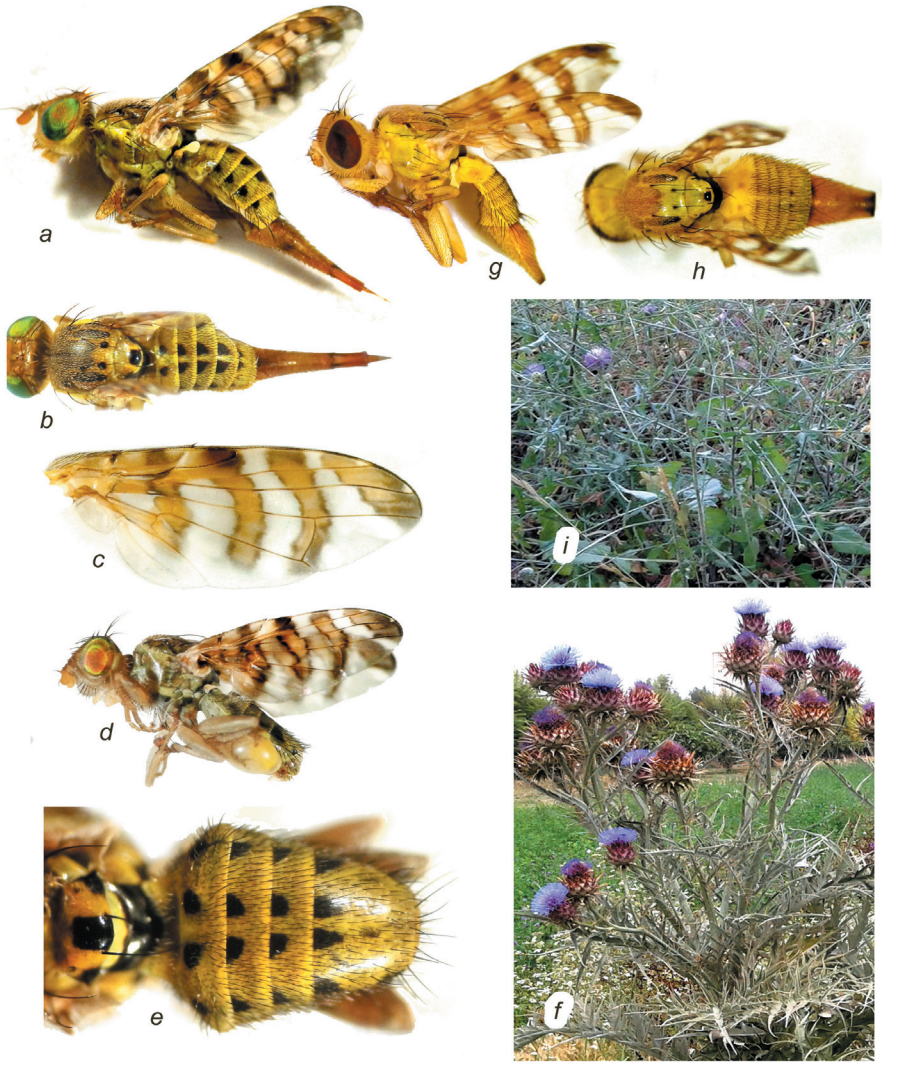

Fig. 9. *Chaetostomella cylindrica* aggr. (*a–f* — from *Cynara cardunculus, g–i* — from *Mantisalca salmantica*): *a–b*, *g–h* — female habitus (*a,* g — lateral view), (*b, h* — dorsal view); *c* — wing; *d–e* — male (*d* — habitus, lateral; *e* — scutellum and abdomen); *f, i* — host plants.

Terellia Robineau-Desvoidy, 1830
Terellia luteola (Wiedemann, 1830) (figs 10, *a–e*)

Material examined. Rif: Bakrim (sweeping), 28.04.2019, 1 ♂, 1 ♀ (El Harym); reared from *Carthamus lanatus*, 20.05.2019, 6 ♂, 3 ♀ (El Harym); Aforidane (sweeping), 26.07.2020, 1 ♂, 1 ♀; Aïn Siyed (sweeping), 26.07.2020, 1 ♀ (El Harym).

Host plants. *Carthamus glaucus* M.Bieb., *C. lanatus* L., *C. syriacus* (Boiss.) Čelak., *C. tenuis* (Boiss. & Blanche) Bornmand, *C. tinctorius* (Boiss) (Kugler & Freidberg 1975; Knio et al. 2002). Record of *Onopordum acanthium* L. (Kütük & Varol, 2006) obviously is a mistake. In this study, it was reared from *Carthamus lanatus* L. (fig. 13).

Distribution. Egypt (type locality); Greece, Italy, Spain; Israel; Tunisia (Norrbom et al., 1999); Lebanon (Knio et al. 2002), Turkey (Kütük & Yaran, 2011), Iran (Gharajedaghi et al. 2012; Mohamadzade Namin & Korneyev, 2016).

Terellia oasis (Hering, 1938) (figs 10, *f–g*)
Squamensina oasis Hering, 1938: 405.
Terellia oasis: Norrbom et al., 1999: 222.

Material examined. Rif: Douar Halila (Marabout), net sweeping, 10.06.2018, 1 ♀ (El Harym).

Host plant. Swept from *Mantisalca salmantica* (L.) Briq. & Cavill., which is believed to be its host plant.

Distribution. Algeria (type locality); Morocco (**first record**).

Remarks. *Terellia oasis* (Hering, 1938) is closely related to *T. vectensis* (Collin, 1937) from Great Britain and to *T. pseudovirens* (Hering, 1940) from the Near East and South-Eastern Europe, which sometimes are considered to be synonyms, differing from each other by the host plants, as well as wing and abdominal patterns, but not by the structure of male and female genitalia. Their actual taxonomic status needs additional studies involving DNA sequencing.

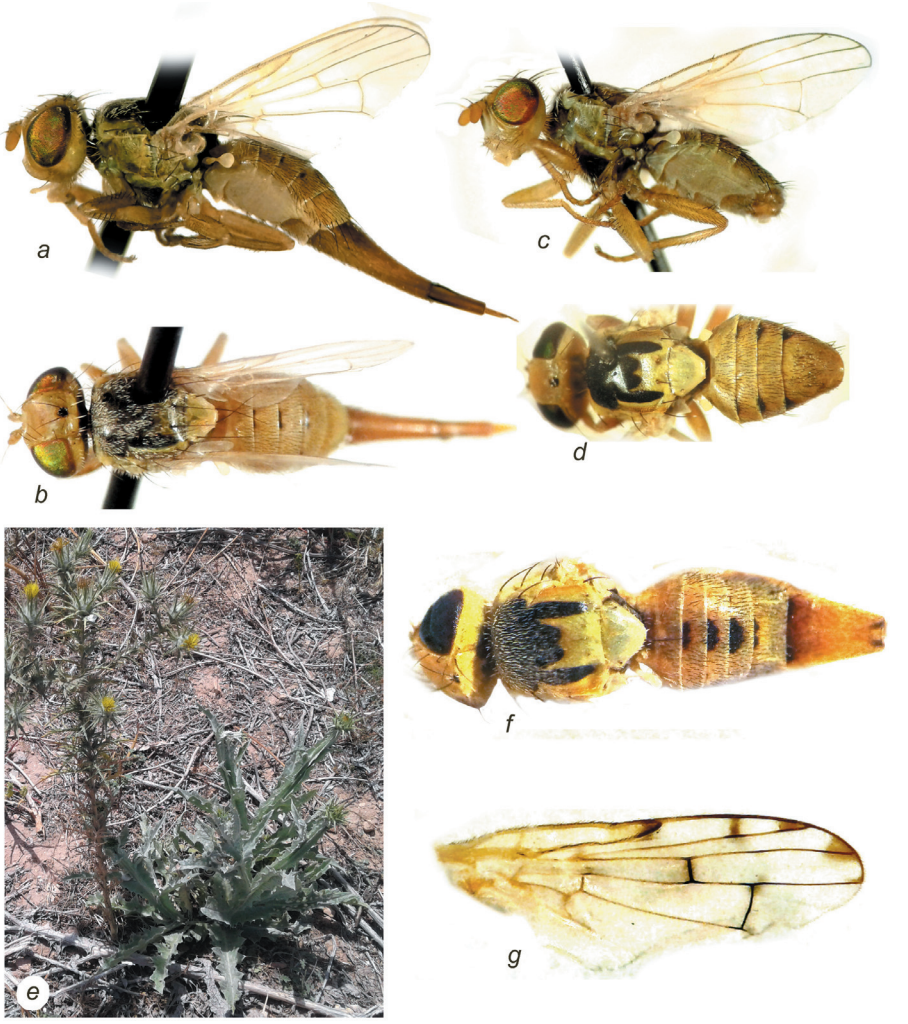

Fig. 10. *Terellia luteola* (*a–e*) and *T. oasis* (*f–g*): *a–b*, *f* — female, *c–d* — male (*a, c* — habitus, lateral view; *b, d, f* — dorsal view), *e* — host plant (*Carthamus lanatus*); *g* — wing.

Conclusion

As a result of this study, new faunal records in 2016–2020 increased the number of fruit fly species known from Morocco to 73.

At present, 121 species are known from North Africa, which consists of almost one-half (45.31 %) of the number of recorded European species. The tephritid fauna of Morocco (73 species) comprises (27.34 %) of the number of European species and 60.33 % of the North African species. The Moroccan species belong to 10 tribes and 30 genera. The tephritid fauna is represented entirely by the species of Palearctic distribution. Morocco has the greatest number of recorded species followed by Egypt, with 70 species or 57.85 % of the total fauna known from North Africa, Algeria, with 37 species or 30.57% and Tunisia and Libya with only 25 (20.66 %) and 9 species (7.43 % of the North African fauna), respectively. This corresponds with higher diversity of landscapes, climates and biotopes of Morocco, from Atlantic and Mediterranean coastal plains to the mountains of Atlas and hot deserts of Sahara.

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