

IDENTIFICATION OF THE EGYPTIAN SPECIES OF CUTWORM GENERA *AGROTIS*, *NOCTUA* AND *SCOTIA* (LEPIDOPTERA – NOCTUIDAE) BASED ON MALE AND FEMALE GENITALIA

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Abstract

Eleven cutworm species (Lepidoptera- Noctuidae) are identified here based on the general colour of moths and the taxonomical characters of the male and female genitalia these are: *Agrotis crassa* (Ersch.), *A. haifae herzogi* (Rebel), *A. ipsilon* (Huf.) , *A. pictifascia* (Hamp.), *A. pierrettii* (Bug.), *A. puta* (H.) ,*A. ripae* (Baker) , *A. spinifera* (H.), *A. trux* (H.), *Noctua pronuba* L. and *Scotia segetum* (D. Sciff.). Keys to the species based on male and female genitalia are presented together with illustrations. Common names, synonyms and host records are provided.

INTRODUCTION

Cutworms are serious pests on the seedlings of many field crops i.e., beet root, spinach, sweet beet (Chenopodiaceae); lettuce, (Compositae); sweet potato, (Convolvulaceae); broccoli, cabbage, kale, rape, turnip (Cruciferae); squash, water melon , cucumber, (Cucurbitaceae); barley, corn, sorghum, sugarcane, wheat (Graminae); alfalfa, beans, chick pea, clover, cowpea, lentil, millet, peas, soyabean, (Leguminosae); garlic, onion, (Liliaceae); cotton, okra, (Malvaceae); strawberry, (Rosacea); egg plant, potatoes, tomatoes, tobacco, (Solanaceae); and carrot, celery, dill, (Umbelliferae). etc. (after Bradley, 1967; Hill, 1975; Karoum *et al*, 1976; Skinner, 1984; Scholtz & Holm, 1985; Carter, 1992; Novak, 2000; Carrera – Suarez, *et al*, 2011; San Blas & Barrionevo 2013; Feizpoor *et – al* 2014 and San Blas, 2014).

The general colours of moths and the taxonomic features of the male and female genitalia are the main basis for the identification of such species. The present work aims to give the accurate identification for the available species of the cutworms in Egypt.

MATERIALS AND METHODS

The species preserved in the main insect Collections especially the Revisional Insect Collection in the Plant Protection Reseach Institute, Minstry of Agriculture,

Dokki, Giza, the Collection of Alfieri in the Faculty of Agriculture, Al-Azhar University at Nasr City (Cairo) and the Collection of Ain Shams University, Fac., of Science, Abbasia (Cairo) are the main source for revising the concerned species. Some of the collected specimens were used for genitalic preparation and for accurate description.

Permanent preparation of the male and female genitalia followed (Mutuura, 1972 & Robinson, 1976), the abdomen of moth was separated carefully from the end of metathorax, boiled in 10 % caustic soda solution for about one hour, then washed in distilled water and dissected in 50% ethyl – alcohol. The male and female genitalia was dehydrated in a series of alcohol from 50 to 95%, then cleared in xylol and finally mounted in Canada balsam.

Scientific names of the species have been confirmed in the British Museum, Natural History, London. Whereas, the common names were (after Sutherland, 1978; Stoetzel, 1989; and Badr, 2007). All the plant scientific names mentioned here were followed Bedevian (1936), Tackholm (1956) and Boulos (1995). Diagnostic characters, synonyms and host records of each species are included. Illustrations of male and female genitalia are also given.

This work is recorded here as part of Ph D. Thesis namely "Taxonomical revision of the most economic moths species (Order: Lepidoptera) in Egypt".

RESULTS AND DISCUSSION

Key to the species based on the male genitalia

- | | |
|--|--|
| 1 - Uncus strong bent thorn and beak-shaped..... | 2 |
| Uncus sickle-shaped | 3 |
| 2 (1) Clasper bent thumb-shaped | 4 |
| Clasper finger or thorn-shaped | 5 |
| 3 (1) Valve swollen, splited at middle; apex of valve long bent finger extention.... | |
| <i>Noctua pronuba</i> | |
| 4 (2) Clasper bent thumb-shaped | <i>Agrotis pictifascia</i> , <i>A. spinifera</i> & <i>Scotia segetum</i> |
| 5 (2) Tegumen short, swollen and bell-shaped | 6 |
| Tegumen long bell-shaped | 7 |
| 6 (5) Saccus cowl-shaped | <i>Agrotis haifae herzogi</i> |
| Saccus short cup-shaped | <i>Agrotis pierrettii</i> & <i>A. puta</i> |
| 7 (5) Socci present, tongue – shaped, saccus wide cup-shaped..... | <i>Agrotis trux</i> |
| Socci absent, clasper bent finger-shaped | <i>Agrotis ipsilon</i> |
| Clasper thorn-shaped | <i>A. ripae</i> |

Key to the species based on the female genitalia

- 1 – Corpus bursae fairly long2
 Corpus bursae short and small*Agrotis pierrettii*
- 2 (1) Corpus bursae large, elongated and sculptured3
 Corpus bursae fairly elongated and long with signa present or absent.....4
- 3 (2) Ostium large crescent – shaped, ostium with four long bean –shaped signa
 *Noctua pronuba*
 Ostium not as such4
- 4 (3) Signa present5
 Signa absent6
- 5 (4) Signum small stone- shaped*Agrotis spinifera*
 Signum rod – shaped*Scotia segetum*
- 6 (4) Ostium vase –shaped*Agrotis ipsilon*
 Ostium cup –shaped*A. crassa*, *A. haifae* & *A. pictifascia*
 Ostium flask – shaped*A. trux*

Superfamily: Noctuoidea**Family: Noctuidae****Section: Trifinae****Subfamily: Noctuinae****Genus: *Agrotis* Ochsenhimer, 1916****Ochsen. Schmett. V. Eur., 4:6.****1- *Agrotis crassa* ab. *golickei* (Erschoff, 1874)**

Euxa golickei Ersch., 1874. Hor. 8, P. 316

E. crassa golickei Ersch., in Seitz; 1913, Mac., Lepid. III, P. 24.

General appearance of moth: Ochreous-brown, speckled with coffee-brown fasciae and lines; ventrally translucent concolours. Wingspan 27- 40 mm in females and 20-35 mm in males.

Female genitalia: Anal lobes (an. l.) long subtriangular and weakly setosed; apophyses posterior (p. ap.) long club-shaped; apophyses anterior (a. ap.) also club-shaped; colliculum and ostium cup-shaped; ductus bursae very short; appendix bursae (ap. b) coiled tube with thin ductus seminalis (d. sem.) at its base, corpus bursae (crp. brs.) fairly long elongated, sculptured with some longitudinal lines and sprinkled with numerous spicules, and with no sigum (sg.).

Material examined: Five moths on bermuda grass, *Cynodon dactylon* Pers., Graminae, Mariout, Oct., 1916 and 1972. (Rev. Ins. Coll.).

Two moths from Kingi Mariout on light, Oct. 1911. (Alfieri Ins. Coll.)

2- *Agrotis haifae herzogi* (Rebel, 1911).

Exuoia herzogi Rebel, 1911. Verh. Zool. bot. Ges., Wien, 16:142

Exuoia securifera Turati, 1924. Att. Soc. Ital. Soc. Nat., 63: 69

General appearance of moth; Ash-grey brown, speckled with dark brown and whitish-cream markings; ventrally glossy colour. Wingspan about 25-28 mm in males and 25-35 mm in females.

Male genitalia: Uncus (un.) strongly thorn-shaped with more tapered apex and long; bristles on dorsal surface; gnathos absent. Tegumen (tg.) small conical-shaped, distinctly with two flaps of minute spicules and setae at each lateral side basally; vinculum (vin.) moderately longer v-shaped, ended with pointed, cowl-shaped saccus (sc.). Valve (v.) somewhat longer than dorsal surface of uncus, blade-shaped; costa with five long setae; apex moderately pointed; cucullus (cu.) with corona (cor.) of one row of short setae; outer margin (o. m.) arched armed with four setae; valvula (valv.) and sacculus sprinkled with numerous spicules; sacculus (scl.) femur-shaped swollen with tapered base with no clavus; clasper (cl.) bent finger-shaped and hummer-shaped with two forks one of it short and one long on outer side of sacculus. Transtilla (tr.) with bean-shaped base at base of costa and thron awl apex attached to bridge-shaped band; juxta (jx.) split molar-shaped with pointed base.

Female genitalia: Anal lobes small triangular plates with short setae and thin arched club-shaped posterior apophyses; eighth segment subquadrate and collar-shaped with stout bent anterior apophyses; ostium cup-shaped attached to wide w-shaped sclerotized flap with eighth segment; ductus bursae short swollen with longitudinal lines and diverging into long narrow striated appendix bursae with small elongated bursae and thin ducts seminalis and somewhat broad striated corpus bursae sculptured with minute spicules in the elongated bursae and with no signum.

Material examined: Three moths Wadi El-Natrun (W-desert) on light, March 1963; nine moths on light, Fayoum, Feb., 1966 & 1975; one moth on clover, Kafr El-Arab (Sharqiya) April, 1971; three moths on light, Giza, May, 1972; two moths on light, Bahtim (Qaliubiya) Jan., 1973; three moths, Dokki (Giza) on light Feb. 1974; five moths on light, Abu Qurqas (Minia) Feb., 1975; three moths, on light, Faques (Sharqiya) Feb., 1975. (Rev. Ins. Coll.).

One moth on light, Maadi (Cairo) March, 1918; One moth on light, Wadi Helal (Helwan-Cairo) April, 1920; one moth on light, Suez, Oct., 1923; one moth on light, Cairo, Feb., 1924; one moth on light, Sinai, Feb., 1925. Four moths on light March & Dec., 1925, 1927 & 1937.(Alfieri Ins. Coll.).

3- *Agrotis ipsilon* (Hufnagel, 1766)

Phalaena ipsilon Huf., 1766. Berl. Mag. III, 416, 99

Noctua suffuse Schiffer, 1776. Wien. Verh., II, 1.80

Agrotis ipsilon Rottenb., 1776. Naturf. IV. 141

Phalaena idonea Cram., 1777. Uitl. Kap., P. 275 H.

Phalaena spinula Esper, 1787. Spinn., 320 T. 63, 6,7

Noctua spinifera De Villers, 1789 Ent. L. II., 174, 110

Phalaena spinula Donovan, 1801. Brit. Ins. 10:52

Noctua rubusta Blanch., 1852. Ceyschile, 75

Agrotis frivola Wallgr., 1860. Wien. Ent. Mon IV. 69

A. aureolum Schaus., 1898. Jor New Y. Ent. Soc. VI, 107

Common name: black greasy cutworm, dark sword moth, ipsilon moth–
ipsilon dart, ipsilon dark cutworm.

General appearance of moth: Dark greyish-brown speckled with pale brown and dark black markings dorsally; glossy cream and pale brown ventrally. Wingspan about 35-50 mm in some forms 40-55mm.

Male genitalia: Uncus strongly bent beak-shaped with more tapered apex and with long bristles on dorsal surface; gnathos absent. Tegumen conical-shaped armed with two densely eyebrow bristles on the lateral sides of base of tegumen and also sprinkled basally with minute spicules; vinculum shorter than tegumen forming with saccus reflexed bell-shaped, saccus cup-shaped with rounded apex and small knob. Valve moderately longer than dorsal surface of uncus, long blade and large sickle-shaped; costa concave apically with long bristles and arched at middle; apex gently pointed; cucullus with one row of short spines corona; outer margin arched and setosed; valvula arched inside and normal; sacculus spiculed with minute spicules ample basally, with pointed apex and with no clavus; clasper forked basally and long bent finger-shaped, ampulla (am.) short and minute owl-shaped at the left fork of clasper. Transtilla two awl-shaped processes at the base of costa; juxta reflexed molar-shaped with incise split at apex.

Female genitalia: Anal lobes triangular setosed plates with thin long posterior apophyses at base; eighth segment subquadrate with short curved thin anterior apophyses; entrance, colliculum and ostium rounded vase-shaped; ductus bursae; narrow sculptured tube, armed by longitudinal lines and minute spicules and diverging into narrow coiled appendix bursae with two longitudinal lines and small elongated bursae and thin ductus seminalis; corpus bursae the second diverging tube, narrow with elongated bursae and also two longitudinal lines and few spicules at base, with no signum.

Material examined: Twenty-three moths, Minia and Beni-suef, on corn and light, Nov., 1963. Thirty-five moths, Magaga (Minia), Shebin El-Kom, Benha, Damanhour (Beheira), Assuit, Matruh and Giza (Dokki) on clover, bermuda-grass and on light, during, Dec. March, Oct. Nov., April and June, 1969, 1971 and 1978 respectively. Forty seven moths, Assiut, Giza, Matruh, Talkha (Daqliya), Alex., Burg El-Arab, Bahtim, on bermuda-grass, clover and light, during Jan., Feb. March, April, May, June, and Nov., 1973 and 1974 respectively. (Rev. Ins. Coll.).

Twenty-five moths, Cairo, Giza, Suez, W. Rishrash (Helwan) and Sinai, on light, during Jan., Sep., April, March & June, 1913, 1917, 1918, 1920, 1923, 1927, 1935, 1937 and 1940 respectively. (Alfieri Ins. Coll.).

Nineteen moths, Giza Wadi-Digla (Maadi, Cairo), Dakhla Oasis, Gabel Asfar (Cairo) on light, during April, Feb., July, Jan., and March, 1951-1954 respectively. (Ain Shams Ins. Coll.).

Host plants: A polyphagous cutworm attacking seedlings of most crops i.e. beet root, spinach, sugarbeet, sweet beet, white beet (Chenopodiaceae); lettuce, raddish (Compositae); sweet potato, (Convolvulaceae); cabbage, rape, turnip (Cruciferae); barley, bermuda grass, corn, , rice, wheat (Graminae); alfalfa, lucerne beans, clover, soyabean, (Leguminosae); onion, (Liliaceae); cotton, (Malvaceae); strawberry, (Rosacea); egg plant, potatoes, tomatoes, tobacco, (Solanaceae); carrot (Umbelliferae). After (Hill, 1975; Skinner, 1984; Carter, 1992, & Novak 2000).

4- *Agrotis pictifascia* (Hampson, 1962)

Agrotis albaensis Rebel, Zett. Wien. ent. Ges., 32, P. 50 (1948)

Scotia pictifascia Hamp. Berio Boll. Soc. ent. ital 92: 122-125 (1962)

General appearance of moth: Yellowish-brown, sprinkled with yellowish spots; ventrally glossy cream. Wingspan about 25-30 mm.

Male genitalia: Uncus gently bent right long, beak-shaped with finger-shaped, apex and long bristles dorsally; gnathos absent. Tegumen bell-shaped, somewhat narrow apically, lateral sides reflexed flap ended with two curved lateral arms clothed with long bristles. Vinculum U-shaped; saccus and base of vinculum reflexed cowl-shaped with short thorn apex. Valve blade-shaped moderately shorter; apex rounded, setosed with corona of one row of short stout setae; costa of valve with three long stout setae and other short setae; outer margin, valvula and sacculus with short and long setae; clasper bent thumb-shaped projection and forked basally; sacculus ample femur -shaped with short bent projection at base and with no clavus. Transtilla derived from the base of costa in two long bent finger-shaped extension; juxta subtriangular plates -like molar-shaped with pointed apex.

Female genitalia: Anal lobes subquadrated, small, setosed, and armed with thin; posterior apophyses; anterior apophyses straight, stout and club-shaped; colliculum, entrance and ostium cup -shaped; ductus bursae short, swollen and striated, and diverging into long, broad, sculptured and striated appendix bursae with tubular chitinized coiled bursae and ending with long thin ductus seminalis; corpus bursae the second branch is broad tube striated and sculptured, globular and with no signum.

Material examined: All moths on light, two moths Maadi (Cairo), Oct., 1910; seven moths, Gabel Elba (Red Sea). (Rev. Ins. Coll.)

5- *Agrotis pierrettii* (Bugnion, 1837)

***Euxoa pierretti* Bugnion, 1837 Ann. Soc. Ent. France P. 441**

General appearance of moth: Brownish-clay speckled with dark chocolate-brown markings; ventrally glossy concolours. Wingspan about 20-28 mm, in males and 25-35 mm in females.

Male genitalia: Uncus strongly beak-shaped more tapered at apex and with long bristles on dorsal surface; gnathos absent. Tegumen bell-shaped, sculptured with minute spicules and moderate eyebrow bristles at the lateral sides of base; vinculum V-shaped; saccus reflexed cowl-shaped with pointed apex. Valve narrow blade-shaped, distinctly shorter than dorsal surface of uncus; costa concave towards apex and with four setae; apex gently rounded with corona of one row of short bristles; outer margin arched apically and convex inside with short setae; valvula and sacculus sculptured with minute spicules and short marginal setae; sacculus ample femur-shaped with pointed base and with no clavus; clasper forked thorn-shaped extension. Transtilla small bean-shaped at the base of costa ended by arched small awl-shaped; juxta bifid molar-shaped with pointed base.

Female genitalia: Anal lobes subtriangular bristled plates armed basally with thin and club-shaped posterior apophyses; anterior apophyses arched, stout and club-shaped; eighth segment subquadrated and collar-shaped; ostium small; ductus bursae tubular with chitinized longitudinal lines inside; appendix bursae small strawberry-shaped distinctly attached to apex of corpus bursae and ended by thin ducts seminalis, corpus bursae small elongated, striated and with no signum.

Material examined: Three moths Wadi kilab, (Sinai) Nov., 1917. (Rev. Ins. Coll.).

Five moths on light, Sidi Gaber (Alex.) sept., 1917; Mariout, Nov., 1920; Alexandria, Nov., 1922; Ikingi Mariout, Oct., 1923 & Nov. 1926. (Alfieri Ins. Coll.,).

6- *Agrotis puta* (Hubner., 1800)

Noctua puta. H., 1800 Samml. Eur. Schmett. Noct., p. 255

Noctua lignosa God., 1821. Lep. France, 11: 241

Bombyx radius How., 1803. Lep. Brit. Mus., P. 119

Agrotis radiola Steph., 1829. B. Ent. Haust, 2, 119

Agrotis puta v. obsoura Tutt., 1892 B. Noct., 11-75

Common name: Corn cutworm-wheat cutworm- Cruciferous cutworm-beans cutworm

General appearance of moth: Buff-brown mottled with coffee-brown markings; ventrally translucent concolours. Wingspan about 25-38 mm in female and about 20-25 mm in males.

Male genitalia : Uncus curved beak-shaped, pointed at apex and with long bristles on its dorsal surface; gnathos absent. Tegumen small bell-shaped, base of lateral sides sculptured with minute spicules and short eyebrow bristles; vinculum v-shaped; saccus reflexed bell-shaped. Valve blade-shaped, moderately longer than dorsal surface of uncus; costa concave towards apex with three short setae; apex gently rounded, cucullus with one row of short stout setae namely corona; apex and outer margin with long setae; valvula convex inside and normal; clasper long finger projection and forked basally; sacculus ample femur-shaped with pointed base. Transtilla bean-shaped at base of costa and short curved awl projection; juxta molar-shaped with short thorn projection.

Material examined: All moths on light, from Gabel Elba (Red sea), Jan., 1933; two moths Gabel Oweinat (Suez) Nov., 1937; three moths, Fayoum, Feb., 1966; two moths, Wadi El-Natrun, March, 1965. Three moths, Dokki, Oct., 1973; three moths Bahtim (Qaliubiya) Dec., 1973 and two moths Faques (Shargiya) April, 1975. (Rev.Ins. Coll.).

Six moths on light, from Maadi, Oct., 1913; Beni-Suef, Nov., 1913; Ikinqi Mariout, April, 1917 & Dec., 1923; Mariout, Feb., 1925 and Wadi El-Natrun, Nov., 1927. (Alfieri Ins. Coll.).

Host plants: beet root, sugar beet, (Chenopodiaceae); (Compositae plants); (all cruciferous plants); barley, corn, ray-grass (bermuda grass), sorghum, sugarcane, wheat(Graminae); alfalfa, all beans, millet, soyabean, (Leguminosae); (all Solanaceous plants); celery, dill, (Umbelliferae) etc.

7- *Agrotis ripae* Baker, 1894

Agrotis ripae ab. *alexandriensis* (B-Baker, 1894) Trans ent. Soc. Lond., P. 37

General appearance of moth: Straw-brown mottled with dark brown markings; ventrally bright whitish-cream. Wingspan about 34-36 mm.

Male genitalia: Uncus strongly bent thorn-shaped with pointed apex and densely bristled dorsally; gnathos absent. Tegumen bell-shaped, with minute spicules and long bristles eyebrow-shaped at the base of lateral sides. Vinculum V-shaped; saccus long reflexed split, cowl-shaped with pointed apex. Valve long blade-shaped, distinctly longer than dorsal surface of uncus; costa concave near apex with five setae; corona with one row of short stout setae; apex gently pointed; outer margin arched with few setae; valve with short fine bristles inside; clasper forked thorn-shaped; sacculus sprinkled with minute spicules, femur-shaped with short awl-shaped base. Transtilla long bean-shaped at base of costa, ending with short curved thorn projection; juxta split molar-shaped.

Female genitalia: Anal lobes small triangular plates and weakly setosed, armed basally with long thin club-shaped posterior apophyses; eighth segment subquadrate armed by thin stout anterior apophyses; ostium v-shaped; ductus bursae short striated and diverging into coiled appendix bursae, with broad striated tube and narrow elongated bursae, ending with thin ductus seminalis. The other tube broad striated leading to globular corpus bursae, sculptured with minute spicules and with no signum.

Material examined: All moths on light, four moths, Alexandria, Nov., 1913; two moths, Dokki, Oct., 1971 six moths, Mariout, Oct., 1972; two moths, Mariout, Sep., 1973. (Rev. Ins. Coll.).

Three moths, Sinai, on light, Oct., 1916; one moth, Ikingi Mariout, Nov., 1917; one moth, Ramleh (Alex.) Nov., 1922 and one moth, Montazah (Alex.) June, 1931. (Alfieri Ins. Coll.).

8- *Agrotis spinifera* (Hübner, 1808)

Noctua spinifera H., 1808. Samml. Eur. Schmett., Noct., P. 389

Common name: Clover cutworm, tomatoes cutworm, spined forewing moth, beet-root cutworm, corn nursery cutworm, carrot cutworm, ray-grass cutworm

General appearance of moth: Brownish-clay mottled with dark chocolate-brown spined markings., ventrally glossy brownish-clay. Wingspan about 25-35 mm in female and 20-30 mm in males.

Male genitalia: Uncus distinctly bent right, strong beak-shaped with more tapered apex and long bristles on dorsal surface; gnathos absent. Tegumen conical-shaped narrow apically and wide basally, armed with minute spicules and bristled with two rows of eyelashes bristles at base of lateral sides; vinculum v-shaped and with pointed cowl-shaped saccus. Valve blade-shaped; costa concave apically, convex basally with five short setae; apex moderately pointed with long setae and with one row of short setae on cucullus namely corona; outer margin with long and short

setae; sacculus chitinized femur-shaped with sharp base and with no clavus; clasper bent thumb-shaped and forked at base; editum ampulla and digitus absent; outer margin and sacculus with minute spicules. Transtilla with bean-shaped base at the end of costal base and terminating with short bent awl-shaped process; juxta small molar-shaped with thorn base.

Female genitalia: Anal lobes triangular and bristled; eighth segment subquadrated ended with two arched stout anterior apophyses; posteriors somewhat long thin and arched inside; entrance, colliculum and ostium crescent-shaped with bent lateral sides and subquadrate narrow stirped cap-shaped apically; ductus bursae funnel-shaped strongly sculptured with longitudinal stripes, diverging into long coiled appendix bursae with small elongated bursae and thin ductus seminalis, and also to long thin corpus bursae ending with small globular bursae and rounded sclerotized stone signum.

Material examined: One moth on bermuda grass, April, 1912; two moths on potatoes, Giza, Jan., 1932; three moths on broad bean, Kafr El-Arab, Jan., 1932; five moths on light from Kharga Oasis, March 1932; one moth on light Kingi Mariout, Jan., 1933; three moths Warraq El-Arab (Giza) on potatoes, March, 1934; one moth from Baharyia Oasis, March 1934, one moth on Oak, Helwan, (Cairo) March, 1934; two moths on light wadi Assuti (Sinai) May, 1935; Five moths on carrot, Giza, March, 1936; on moth on adonis, Jan., 1955. (Rev. Ins. Coll.)

Eighteen moths from Giza on potatoes, bermuda grass, (March, 1934; Jan., 1955; Pyramid, April, 1955, & Feb., 1957). Five moths, Helwan on bermuda grass, Nov., 1935; nine moths, Kafr El-Arab (Giza) on tumbleweed and on wild amaranth, Nov., 1955. (Rev. Ins. Coll.)

Five moths on reed and persian cane from Giza, Shubra (Cairo), Diarout (Beheira), Maadi (Cairo) (April, 1922; Sept. , 1923; Oct., 1924, & Nov. 1954) (Alfieri Ins. Coll.).

Four moths on light, Cairo, April & July 1951 & 1953; Al-Mansoura, April, 1957 and Mersa Matrouh Sept., 1957. (Ain Shams Ins. Coll.).

Host plants: tumbleweed, *Amaranthus abyssinica* Hort, amaranth, *Am. blitum* L., and Prince's feather, *Am. Caudatus* L. (Amaranthaceae), beet, Mexican tea, *Chenopodium ambrosioides* L. (Chenopodiaceae); bermuda grass, *Cynodon dactylon* Vill., corn, (Graminae); oak, *Quercus* spp. L. (in arabic sindian) (Fam. Fagaceae); clover, (Leguminosae); cotton, (Malvaceae); potatoes, tomatoes, (Solanaceae); *Adonis aestivalis* L (Summer Adonis), *Adonis microcarps* DC., (Ranunculaceae); tamarisk, *Tamarix articulate* Vahl., (Tamaricaceae); carrot, (Umbelliferae). etc.

9- *Agrotis trux* (Hübner, 1826)

Noctua trux H., 1826 Samm. Eur. Shmett., Noct: 723-725

General appearance of moth: Ochreous-brown, speckled with clay-grey scales and coffee-brown markings, female moths darker than males; ventrally translucent cream-clay. Wingspan about 26-38 mm.

Male genitalia: Uncus strongly bent thron-like beak-shaped, with long bristles dorsally; gnathos absent; socii (soc.) long tongue-shaped, membraneous present at base of uncus. Tegumen long bell-shaped narrow with some bristles at base of lateral sides and with numerous spicules; Vinculum somewhat parallel sides apically forming long cup-shaped with saccus. Valve moderately longer than dorsal side of uncus, blade-like sickle-shaped; costa concave towards apex, convex at middle; cuculus with one row of stout spines; outer margin with few long spines valvula sclerotized with minute spines and long bristle-like hairs at base of sacculus; clasper long strong bent finger-shaped and forked at the base of clasper; sacculus normal. Transtilla located at the base of costa tapered to bent finger-shaped projection; juxta molar-shaped and pointed base, bifid and surrounding with two club-shaped clavus with minute spines at their apex.

Female genitalia: Anal lobes triangular setased plates; posterior apophyses thin and longer than anteriors; eighth segment subquadrated; ostium, entrance and colliculum flask-shaped; ductus bursae narrow, short and chitinized, diverging into appendix and corpus bursae; appendix bursae fairly long, striated, narrow tube, coiled ending with globular bursae and with ductus seminalis at its apex; corpus bursae elongated with no signum.

Material examined: Two moths on bermuda grass, Benha (Qaliub.) Dec., 1970; 24 moths Alexandria on grasses, Jan., 1971 & Oct., 1971; 27 moths on light-tarp Dokki (Giza) Nov., May, June, March & Jan., 1972, 1973, 1974; 13 moth from Bahtim (Qaliub) on L.T., July, Dec., Jan., 1972, 1973 & 1974; 2 moths from Abu Hummus (Beheira) on L.T., Nov., 1972 , 1974; two moths on cotton, Faiyoum July, 1974; 42 moths from Faques (Sharqiya) on L.t., Aug., Dec. & Jan., 1974 & 1975. (Rev. Ins. Coll.).

Two moths from Cairo on light Nov., 1915; six moths on corn from Giza, Jan., 1923; Six moths on light from Giza Sept. Oct. & Nov., 1923; Four moths on light from Dairout and Mariout Dec., 1923 & 1924. (Alfieri. Ins. Coll.)

Genus: *Noctua* L., 1758 Syst. Nat., X, ed.

10 - *Noctua pronuba* Linnaeus (1758)

Syst. Nat., X, ed. P.513

Common name: large yellow underwing moth (Carter, 1992 & Novak, 2000)

Orange underwing moth, greater orange – chestnut moth

General appearance of moth: Bright chestnut-brown and deep orange-yellow in male moths, while reddish-brown in female moths; in both sexes the hindwing is orange-yellow with brown-chocolate border which gives rise to the common name (large yellow underwing, Carter, 1992); there are some brownish-grey markings in male forewing; ventrally glossy brownish-yellow, wingspan about 47-60 mm.

Male genitalia: Uncus pointed sickle-shaped with minute bristles dorsally; gnathos absent. Tegumen ample bell-shaped, sprinkled with minute spicules and fine bristles laterally near apex; vinculum long and wide V-shaped, saccus and base of vinculum reflexed cowl-shaped with pointed tip. Valve distinctly longer than dorsal surface of uncus, costa with deep split near middle, the apical part swollen papilla-like extension; apex long curved finger-shaped and with four long setae; outer margin setosed; clasper forked rod, the right one sickle shaped, the left one (ampulla) arched and setosed with minute spines the extension diverging from long sclerotized rod stem; sacculus ample with no clavus. Transtilla not seen; juxta long reflexed jug-shaped.

Female genitalia: Anal lobes collar-shaped and densely bristled; posterior apophyses sickle-shaped and bent, anteriors short and stout finger-shaped; eighth segment quadrated; ostium, entrance and colliculum crescent and large funnel-shaped; ducts bursae distinctly wide apically, broad and chitinized; appendix bursae elliptical attached with thin tube to the apex of corpus bursae and with thin ductus seminalis at its apex; corpus bursae large elongated pumpkin-shaped strongly striated and with four long bean pods signa.

Material examination: All moths collected on light, three moths Mushtohour (Qaliub.) Aug., 1952; 28 moths Dokki (Giza) May, 1962, Oct., 1972-April, 1973; 19 moths on L.T. Bahtim (Qaliubiya) Dec., 1973, 1974), six moths on clover, Gharbiya, March, 1973; Ten moths on L.T., Faqus (Sharqiya) Feb., 1975; two moths on L. T., Abu Hummus (Beheira) May, 1975. (Rev. Ins. Coll.).

One moth on L.T., Alexandria May, 1911; one moth on L.T. Maasara, April, 1914; three moths on L.T. April, 1937- May, 1954 & April, 1957 (Alfieri Ins. Coll.)

Two moths on L.T. Burg El-Arab (N. Coast), March, 1956, and three moths on L.T., Al-Mansoura (Daq.) April, 1957.(Ain Shams Ins. Coll.).

Host plants: This species feeds on dock (*Rumex*) and dandelion (*Taraxacum*) (Carter, 1992); causing damage to vegetables (Novak, 2000).

Genus *Scotia* Hübner, 1821 Verz., P. 226

11 - *Scotia segetum* (Denis & Sciffermuller (1776)

Noctua segetum Schiff., 1776. Wien. Ver. 2, p.81

N. connexus Haw., 1903 Lep. Brit. Cortious. Haw., 1803 Id., 116; *menileus* Haw., Id 115; *nigricornutus* Haw. Id. 117; *Peotinatus* Haw., Id. 115 (1803).

N. segetis H. 1803. Samml. Europ- Schmett. Noc. Fig. 146

Bombyx spinulas Haw., 1803 Lep. Brit., 45

B. subtratus Haw., 1803. Ent. Soc. Ph.1

B. praecox Hübner, 1808 Samml. Eur. Schm. Noct., F. 359

B. spinula Donovan., Brit. Inst., 10:52, Pl. 345

Euxoa glawoia Kozhant. Staat. Minuss., 1, 31

Common name: Turnip cutworm, turnipworm, turnip moth, raddish cutworm

cruciferous cutworm.

General appearance of moth: Chocolate-brown, speckled with greyish-brown and dusky-back pattern; female moths darker than males; ventrally glossy beige. Wingspan about 30-40 mm.

Male genitalia: Uncus thorn beak-shaped, strongly bent right and bristled dorsally; gnathos absent. Tegumen bell-shaped narrow apically, broad basally and somewhat bristled and spiculed at base of lateral sides, vinculum distinctly v-shaped with pointed saccus. Valve at the same level of dorsal surface of uncus and blade-shaped; costa and outer margin and sacculus with long spines; apex pointed with one row of short spines corona on cuculus; outer margin and sacculus spiculed with minute spicules; clasper thumb-shaped bent at apex and forked at base; ampulla, digitus and editum not present; sacculus femur-shaped armed with small papilla-like extension at

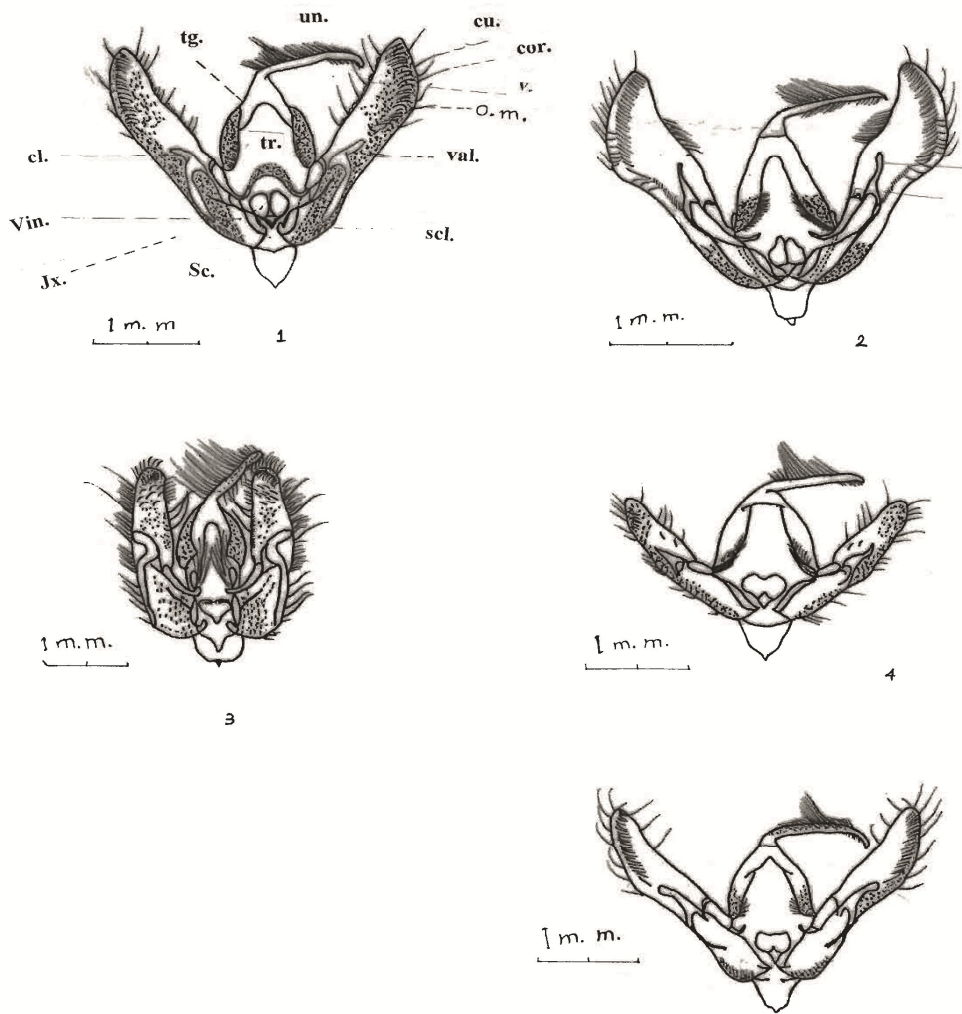
base. Transtilla two thron- shaped curved extension at base of costa; juxta molar - shaped with pointed base.

Female genitalia: Anal lobes subtriangular plates with long bristles; apophyses thin and club- shaped eighth segment small and subquadrate; ostium and colliculum wide funnel- shaped in the form of hat-shaped; ductus bursae broad apically sculptured with longitudinal stout lines; appendix bursae narrow coiled and elongated with thin ductus seminalis at apex; corpus bursae fairly long tubular apically and elongated basally armed with long sclerotized rod-like signum and with longitudinal lines. long elongated with long tubular tube apically, armed with strong rod-shaped sigum.

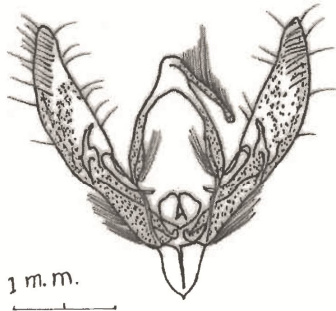
Material examined: Seventy moths from Al-Minia, Damietta, Giza, Tanta, Alexandria, Matrouh, Bhatim, Al-Mansoura, Dokki, Zagazig, Damanhour, Fayoum and Sohag on light, clover, bermuda-grass, throughout Jan- Sep., 1969, 1970, 1971, 1972, 1973& 1974 respectively (Rev. Ins., Coll.)

Three moths from shubra (Cairo), Sidi Gaber (Alex.) and El-Kontella (Sinai) on light within April, May and Oct. 1912, 1920 and 1936 (Alfieri. Ins. Coll.)

Host plants: A polyphagous cutworm attacking the seedlings of many crops and vegetables and root crops (Hill, 1975) some hosts were recorded i.e. leeks, (Alliaceae) beet-roots spinach, (Chenopodiaceae); raddish, sunflower (Compositae); turnip, (Cruciferae); cabbage, (Cucurbitaceae); Kale, rape (Graminae); vegetables seedlings i.e. celery, (Umbelliferae) onion (Liliaceae); cotton, (Malvaceae) peppers, (Solanaceae) rhubarb, chicory.



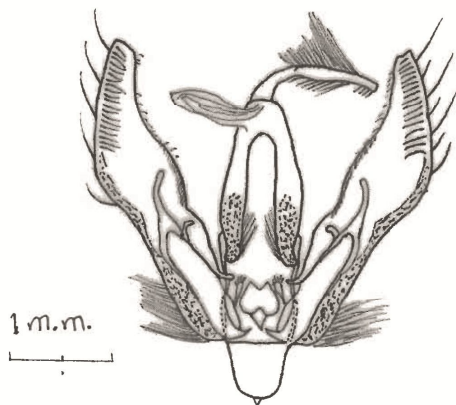
- 1- *Agrotis haifae herzogi* (Rebel)
- 2- *A. ipsilon* (Huf.)
- 3- *A. pictifascia* (Hamp.)
- 4- *A. pierrettii* (Bug.)
- 5- *A. puta* (H.)



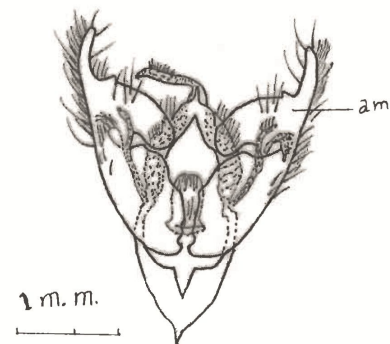
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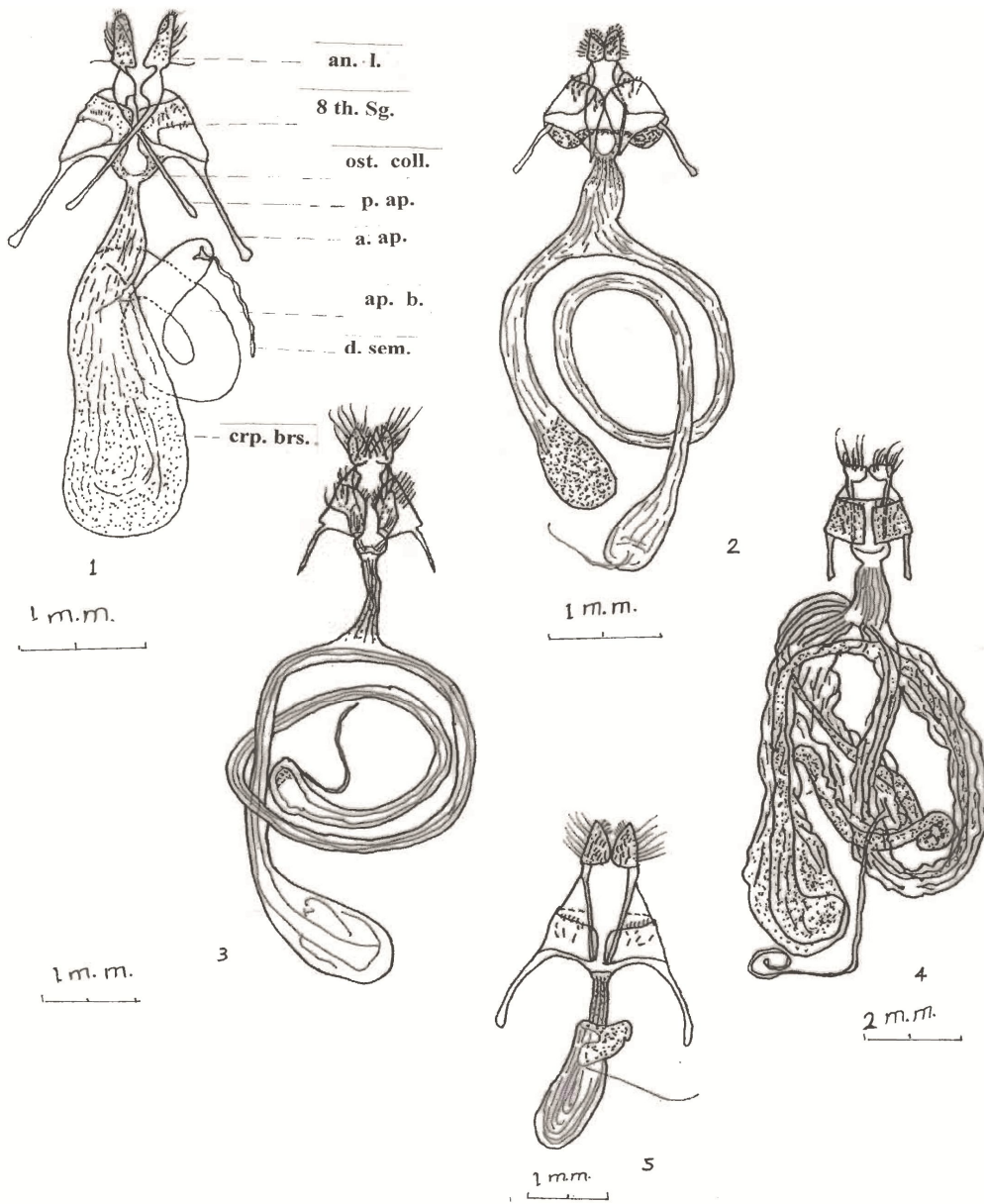
6- *Agrotis ripae* (Baker)

7- *A. spinifera* (H.)

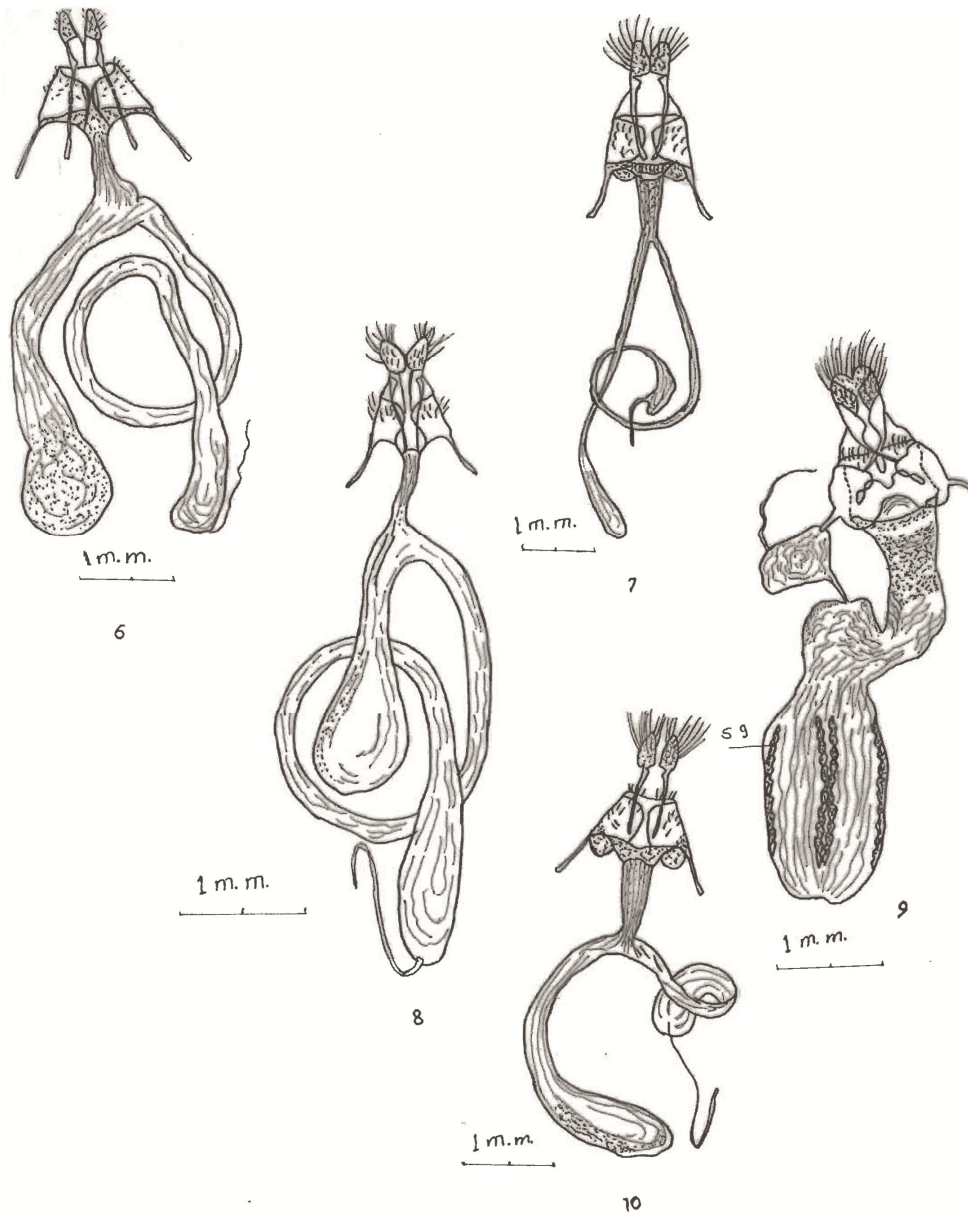
8- *A. trux* (H.)

9- *Noctua pronuba* L.

10- *Scotia segetum* (D. Sciff.)



- 1- *Agrotis crassa* (Ersch.)
- 2- *A. haifae herzogii* (Rebel)
- 3- *A. ipsilon* (Huf.)
- 4- *A. pictifascia* (Hamp.)
- 5- *A. pierrettii* (Bug.)



6- *Agrotis ripae* (Baker)

7- *A. spinifera* (H.)

8- *A. trux* (H.)

9- *Noctua pronuba* L.

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تميز أنواع الديدان القارضة المصرية من أجناس *Agrotis* و *Noctua* و *Scotia*
رتبة حرشفية الأجنحة - فصيلة نوكتويدى بالإعتماد على الجهاز التناسلى
المذكر و المؤنث

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تضمنت الدراسة التقسيمية الحالية تمييز وتعريف إحدى عشرة نوعا من فراشات الديدان
القارضة وذلك بالإعتماد على الصفات التصنيفية لأجهزة التناسل المذكرة والمؤنثة .
تهدف هذه الدراسة إلى تسهيل عملية التسمية الدقيقة للأنواع المدروسة لخدمة الدراسات
التقسيمية والمكافحة المتكاملة والإرشاد الزراعى.
هذه الأنواع هى:-

Agrotis crassa (Ersch.), *A. haifae herzogi* (Rebel), *A. ipsilon* (Huf.) , *A. pictifascia* (Hamp.), *A. pierrettii* (Bug.), *A. puta* (H.) , *A. ripae* (Baker) , *A. spinifera* (H.), *A. trux* (H.), *Noctua pronuba* L. and *Scotia segetum* (D. Sciff.).

دعمت الدراسة بالرسومات التوضيحية لأجهزة التناسل المذكرة والمؤنثة وكذلك بالمراجع المتخصصة.
الأسماء العلمية الحالية تم التصديق على صحتها فى المتحف البريطانى للتاريخ الطبيعى فى لندن.