REDISCRIPTION OF SOYBEAN LOOPER *PSEUDOPLUSIA INCLUDENS* (WALKER) (LEPIDOPTERA: NOCTUIDAE: PLUSIINAE) FROM PAKISTAN WITH ITS CLADISTIC RELATIONSHIP

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Abstract

The soybean looper, *Pseudoplusia includens* of the Noctuidae is first time described with special reference to its head component, venations of fore and hind wing and its male genital components. The cladistic relationship is also discussed by using its apomorphies with in the group.

Introduction

Habeck (1968) annotated a key to the Plusiinae moth of Florida, in which he coupled the species *Psudoplusia includens* (Walker) with *Argyrograma besigera* (Walker) and differentiate by the presence of dark spots on fore wings. Walker *et al*. (2000) studies field evaluation of soybean engineered with a Synthetic CRP 1AC transgenic for resistance to other pests and as well as *Psudoplusia includens*.

Landolt and Heath (1987) studies the role of production of female sex pheromone in behavioral reproductive isolation between two Plusiinae species *Trichoplusia includens*. Kidd and Orr (2001) studies the comparative feeding and development of *Psudoplusia includens* on Kudzu and soybean foliage. Poague (2005) studied seventeen species of Plusiinae from Great Smoky Mountains national park, with reference to their flight period, distributional range and larval host.

Materials and Methods

The specimens of *Pseudoplusia includens* (Walker) were collect on the light trap from Malir, Karachi. For the study of male genitalia the abdomen was removed from the base and was boiled 10% KOH on a bench lamp for about 3-5 minutes, then washed with tap water and were dissected and their diagrams were made placing these on the cotton threads under glycerin and pinned with the specimens followed by Kamaluddin and Ahmed (1996), Kamaluddin (2002), Shakira and Kamaluddin, (2011 and 2012).

Genus*: Pseudoplusia* McDunnough 1944
Pseudoplusia McDunnogh, 1944, *in cramer. Mem. Sth. Calif. Acad. Sci.2*: 206

Diagnostic feature: Body generally grayish brown with whitish silvery lobe on fore wings, head with frons sub-rounded, vertex slightly raised, palpi with basal segment shorter than 2nd, 3rd segment short, proboscis large, fore wings much longer than hind wings, anterior margin sinuated, apical margin crenulated with apical angle sub- acute, veins R3 and R4 largely stalked and originating upper angle of cell, only one anal vein (1A) present, hind wings with anterior margin slightly convex, apical margin crenulated, veins Sc+R1 confluent with Rs at base, Rs originated just above from upper angle of cell, two anal veins (1A and 2A) present.

Genitalia: In males tegumen elongated, devoid of saccus, uncus moderate at apex thorn-like, gnathos membranous, paramere large, simple, distally broad, aedeagus tubular, large, membranous conjunctival lobe very large with thorn-like and series of cornuti.In females papillae anales large, both apophysesses large, ductus bursae and carpus bursae very large.

Comparative note: This genus is most closely related to the genus *Chrysodeixis* in having frons slightly produced and palpi with 2nd segment less than 2X the 3rd segment but it can easily be separated in the same in having fore wings with vein M1 originates from upper angle of cell, apex of paramere broad and by the other characters as noted in the key and description.

Type species: *Phalaena* Stoll 1780

Distribution: Palaearctic and Oriantal regions.

Fig. 1

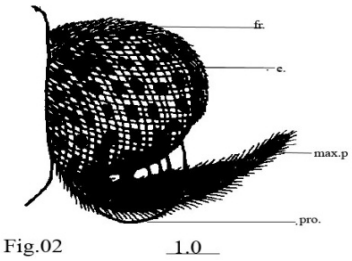

Fig. 2

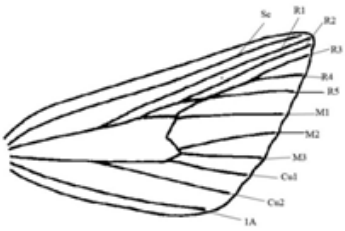

Fig. 3

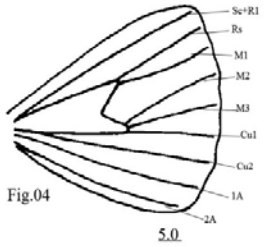

Fig. 4

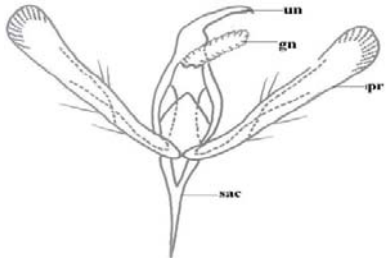

Fig. 5

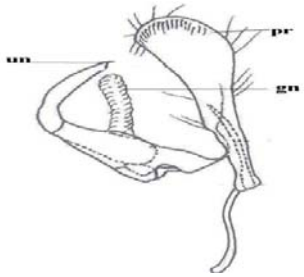

Fig. 6

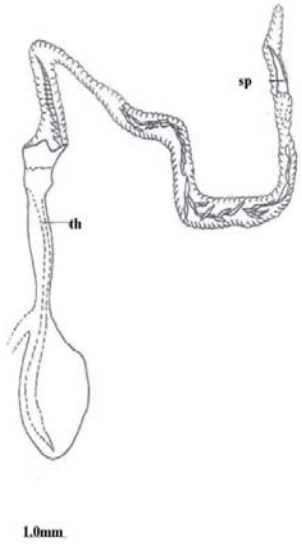

Fig. 7

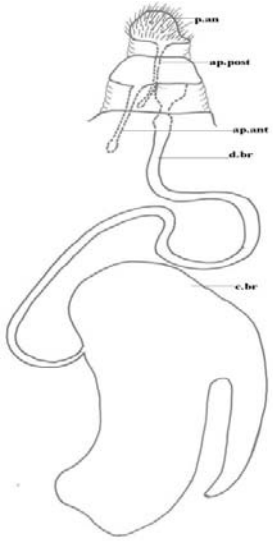

Fig. 8

Illustration of figures: Figs. 1 – 8. *Psudoplusia includens* (Walker). 1. Entire, Dorsal view; 2. Head, leteral view; 3. Fore wing, dorsal view; 4. Hind view, dorsal view; 5. Tegumen, ventral view; 6. Same, lateral view; 7, Aedeagus, lateral view, 8, Female genitalia, lateral view.

Key to the letterings: aed. (aedeagus), crn (cornuti), th (theca), th.app (thecal appendages), sp. (spines), e. (eye), fr. (frons), gn. (gnathos), max.p. (maxillary palp), pro. (proboscis), pr. (paramere), sac. (saccus), un. (uncus), 1A- 3A. (first to third anal veins), Cu_1- Cu_3 (cubitus vein first to third), M_1- M_3.(median vein first to third), R_1-R_5 (radius vein first to fifth), Rs. (radio-suctorial vein), Sc. (sub-costal vein). p.an. papillae anale), ap.ant. (apophysis anteriors), c.brs. (corpus bursae), d.brs (ductus bursae),

Pseudoplusia includens **Walker**
(Figs. 01-07)
Pseudoplusia includens Walker, *cat*. 1858; Pogue, 2005, *Zootaxa. 1032*: 1-28.

Colouration: Body generally brown, fore wings brown except whitish silvery mark medially occupied by a brassy white lobes, hind wings brown pale, fuscous median and marginal area.

Head (Fig. 02): Frons sub- rounded, palpi well developed, besets with scales, basal segment about 1/2 the length of 2nd, later about more than 2X the 3rd segment, proboscis large and highly coiled.

Fore wings (Fig. 03): Fore wings with anterior margin straight and posteriors margin convex, apical margin crenulated, with apical angle sub-acute, vein Sc widely separated and parallel to R1, R2 originates from above upper angle of cell, R3 and R4 largely stalked and further anastomosing with R5 and originating from upper angle of cell, M1 originates from below upper angle of cell, M3 originates from lower angle of cell, Cu1 and Cu2 parallel to each other, only one anal vein (1A) is present,

Hind wings (Fig. 04): Hind wings with anteriorly slightly convex and posterior margin distinctly convex, apical margin distinctly crenulated with apical angle sub-rounded**,** veins Sc+R1 confluent with Rs at base, vein Rs originates just above from upper angle of cell, M3 originates from lower angle of cell, two anal veins (1A, and 2A) present.

Wing expansion (Fig. 01): Body size 36 - 39mm with wing expansion.

Male genitalia (Figs. 05 - 07): Tegumen (Figs.05 and 06) elongated, uncus curved with apex, truncated, seccus elongated, largely v-shaped, anteriorly produced into thorn-like process, gnathos membranous and shorter than uncus, paramere large, apically broad, distally narrowed, beset with small and large scattered hairs, aedeagus (Fig. 07) with theca tubular, proximally dilated and distally crown- shaped, semi-scalertized, membranous conjunctival lobe very large, proximally a series of serrated fused spines and medially a chain of small cigar-shaped cornuti, distally a large thorn-like appendage.

Female genitalia (Fig.08): Papillae anales helmet-shaped, apophysesses posteriors medially curved large about equal to apophysis anteriors, both with club-shaped apex, ductus bursae very large, narrowed tube-like, convaluted, corpus bursae large kidney-shaped with a lobe-like process.

Material examined: Two males, Pakistan: Karachi, on light, 12. 08. 2003, leg. Shakira, lodged at Kamaluddin, s collection.

Comparative note: This species is the only species of the genus recorded from Pakistan and can easily be isolated from other species in having palpi with second segment about twice the basal segment, hind wings with vein M1 originates from upper angle of cell, apex of paramere broad and by the other characters as noted in the key and description.

Discussion: The representation of the genus *Psudoplusia*, McDunnough is recorded from Palaearctic and Oriental region. This genus plays sistergroup relationships with *Chrysodeixis* by their synapomorphies like frons slightly produced anteriod and palpi with 2nd segment less than 2Xthe third segment and outgroup relationship by its autapomorphies viz. fore wings with vein M_1 originates from upper angle of cell, the apex of paramere broad and in tegumen the gnathos obsolete.

The species *Chrysodeixis* is a monotypic and is separated from concern taxa under the subfamily by its autapomorphies like palpi with basal segment about the length of 3rd segment , fore wings with veins R_3 and R_4 largely stalked, hind wings with vein M_3 originates from lower angle of cell, the gnathos reduced, and membranous conjunctival lobe of aedeagus very large having proximally a series of serrated fused spines, medially a chain of cigar-shaped corniti and distally a large thorn-like appendage.

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