Redescription of *Vidalia impressifrons* Robineau-Desvoidy, the Type Species of *Vidalia* Robineau-Desvoidy (Diptera: Tephritidae), with Notes on Its Taxonomy and Phylogeny

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Ho-Yeon Han (2002) Redescription of *Vidalia impressifrons* Robineau-Desvoidy, the type species of *Vidalia* Robineau-Desvoidy (Diptera: Tephritidae), with notes on its taxonomy and phylogeny. Zoological Studies **41**(2): 153-157. The taxonomic status of *Vidalia* Robineau-Desvoidy and the identity of its type species, *V. impressifrons* Robineau-Desvoidy, have been highly confused in the past. This problem was resolved by the designation of a neotype for *V. impressifrons* in 1999. To supplement this neotype designation, *V. impressifrons* is fully redescribed, illustrated, and distinguished from its congeners. Its phylogenetic position within *Vidalia* is also discussed based on a detailed examination of the male neotype, which is the only known specimen of this species. http://www.sinica.edu.tw/zool/zoolstud/41.2/153.pdf

Key words: Diptera, Tephritidae, *Vidalia impressifrons*, Neotype.

The genus *Vidalia* Robineau-Desvoidy currently includes 16 valid Oriental and Palaearctic fruit fly species (Han et al. 1994b, Han 1999, Norrbom et al. 1999). There has been a complex nomenclatural history of this genus, and the identity of the type species (*V. impressifrons* Robineau-Desvoidy) is crucial to understanding the generic concept and demarcation. Han (1999) provided the following summary regarding this matter:

There has been controversy about the name *Vidalia*, because the original description (Robineau-Desvoidy 1830) is inadequate, and the type specimen(s) from the East Indies (Indonesia) of the type species, *V. impressifrons* Robineau-Desvoidy, apparently has been lost (Munro 1938, Hardy 1987, Han et al. 1994b). Munro (1938) proposed *V. caratophora* Bezzi as “neogenotype”, but that was not a valid nomenclatural act. Since then, many tephritid species with enlarged male frontal setae have been placed in *Vidalia*. Han et al. (1993 1994a) removed a number of species to 3 other genera (*Paratrypetra*, *Comnurtrypeta*, and *Stemonocera*), and later established a newly recognized monophyletic group under the resurrected name, *Pseudina* Malloch (Han et al. 1994b). However, Hancock and Drew (1995) synonymized *V. quadricornis* Meijere with *V. impressifrons*, resurrecting *Vidalia* for this taxon. Despite the fact that the original description of *V. impressifrons* is not adequate for positive identification, Hancock and Drew's treatment was followed by two recent major tephritid publications (Korneyev 1998, Norrbom et al. 1999). After e-mail discussion involving seven tephritid taxonomists (Freidberg, Han, Hancock, Korneyev, Merz, Norrbom, and White), we agreed to keep the long-used name *Vidalia* by designating a neotype for the sake of nomenclatural stability.

Based on the above decision, Han (1999) designated the holotype of *V. quadricornis* as the neotype of *V. impressifrons* to end this controversy. To supplement this neotype designation, I herein provide a full description of *V. impressifrons* including its genital structure, which contains critical information about its relationships to other members of the genus *Vidalia*. The male neotype is the only known specimen of *V. impressifrons*.

**MATERIALS AND METHODS**

The holotype male of *Vidalia quadricornis* (=
neotype of *V. impressifrons* was loaned from the Zoológisch Museum, Univ. of Amsterdam. The terminology and morphological interpretations used in this paper follow White et al. (1999). The following 8 ratios are used in the descriptions: frontal-head ratio (width of frons/width of head in dorsal view); eye ratio (shortest eye diameter/longest eye diameter); genal-eye ratio (genal height/longest eye diameter); genal height is the distance between the lower eye margin and lower genal margin anterior to the genal seta; aristal-antennal ratio (length of arista/length of the antenna excluding the arista); vein $R_{4+5}$ ratio (distance along vein $R_{4+5}$ between crossvein R-M and wing tip/distance between crossvein R-M and basal node of vein $R_{4+5}$); vein M ratio (distance along vein M between crossveins R-M and DM-Cu/distance between crossveins R-M and BM-Cu); subcostal-costal ratio (length of subcostal cell/length of costal cell, both measured along vein C); and wing-thorax ratio (wing length/thorax length).

**Vidalia impressifrons** Robineau-Desvoidy

*Vidalia impressifrons* Robineau-Desvoidy, 1830: 719 (type-locality: Indes Orientales [Indonesia?]; type(s) destroyed); Hardy 1977: 116 (in Oriental catalog); Kapoor et al. 1980: 53 (Indian distribution); Kapoor 1993: 101 (in Indian key); Han et al. 1994b: 104 (nomenclatural discussion); Norrbom et al. 1999: 257 (in world catalog); Han 1999: 286 (neotype designation—see "Type Material").

*Vidalia quadricornis* Meijere, 1916: 83 (see "Type Material"); Hardy 1977: 116 (in Oriental catalog); Hardy 1987: 368 (type data; diagnosis); Hancock and Drew 1995: 59 (new synonymy with *impressifrons* -- doubtful, but followed here to conserve usage of *Vidalia*); Han 1999: 286 (neotype designation of *V. impressifrons* based on the holotype of *V. quadricornis*).

*Pseudina quadricornis* Han et al., 1994b: 109 (in key to 14 *Vidalia* spp. -- as *Pseudina*).

**Diagnosis:** The neotype male possesses the frontal modification and wing pattern typical of *Vidalia* (Fig. 1), but can easily be distinguished from any other known *Vidalia* spp. by its predominantly dark coloration: 1) frons dark brown, contrasting with yellow-brown occiput and gena; 2) scutum entirely shiny dark brown, contrasting well with the ivory white postpronotal lobes and scutellum; 3) thoracic pleura and legs yellow-brown; and 4) abdominal $T_{3-5}$ shiny dark brown, contrasting with yellow-brown $T_{1+2}$.

**Description:** Body (Fig. 1) dark brown to ivory white with dark brown setae and setulæ; wing length 4.48 mm. Head (Fig. 2) yellow-brown to dark brown with frontal-head ratio 0.47, eye ratio 0.80 and genal-eye ratio 0.10; inner vertical seta 0.8x as long as longest diameter of eye; outer vertical seta 0.4x as long as inner vertical seta; postocellar seta 0.4x as long as inner vertical seta; paravertical seta 0.5x as long as postocellar seta; ocellar triangle dark brown with reduced ocellar seta; frons deeply concave, dark brown, contrasting well with yellow-brown occiput and gena; one strong orbital seta; four frontal setae highly modified, 2nd frontal seta strong and flattened, 1.5x as long as inner vertical seta, 1st frontal setae slightly shorter than inner vertical seta; 3rd and 4th frontal setae much shorter and more proclinated; antenna with aristal-antennal ratio 2.08; scape and pedicel brown with dark brown setulæ; arista dark brown, apparently bare; face brown with lower face slightly projecting beyond anterior margin of parafacial and facial ridge in profile; parafacial very narrow, about 0.2x as wide as flagellomere 1; facial ridge with fine dark brown setulæ; gena yellow-brown with strong brown genal seta; postgena yellow-brown, slightly swollen with brown setulæ; occiput flat, shiny yellow-brown; supracervical setae yellow-brown; postocular setae extending 0.7x distance from upper eye margin to lower eye margin. Thorax (Fig. 1) dark brown to ivory white with dark brown setae and setulæ; postpronotal lobe, upper anepisternum to wing base ivory white, forming distinct streak; scutum shiny dark brown with dorso-central seta slightly lower than postsutural supraocular seta; scutellum ivory white with basal seta 1.8x as long as scutellum, apical seta 1.6x as long as scutellum, apical scutellar setae more or less parallel sided; thoracic pleura entirely yellow-brown,
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proepisternum densely covered with pale setulae; anepisternum with upper seta slightly longer than lower one; katatergite yellow-brown, anatergite and mediatergite shiny dark brown. Legs yellow-brown with brown setae and yellow-brown setulae; fore femur with 6 posterovertral setae; midtibial spur 2x as long as tibial width. Wing (Fig. 1) hyaline with brown dark pattern; wing-thorax ratio 2.0, vein $R_{4+5}$ ratio 1.62, vein M ratio 0.36; $R_{4+5}$ with 9 tiny setulae between node and R-M. Male abdomen (Fig. 1) about as long as wide, tergites 1+2 yellow-brown, tergites 2-5 shiny dark brown; epandrium dark brown and surstyli brown; outer surstylus with both anterior and posterior lobes (Figs. 3, 4); inner surstylus with mesal presiseta slightly larger than lateral presiseta (Fig. 3); aedeagal apodeme wide, fan shaped (Fig. 5); aedeagal glans (Fig. 6) with distinct trumpet-shaped subapical lobe; dorsal sclerite of glans more or less smooth except for subapical protuberance; median sclerite of glans with internal sculptured pattern of round granulations.

**Type Material**: Neotype ♀ (= holotype of *V. quadricornis*) designated by Han (1999) (Fig. 7). Indonesia: Sumatra, Fort de Kock (Bukittinggi). Col. date: written as “10. 1913”. Meijere’s determination label is written as “*Vidalia quadricornis* type” (Fig. 8). Deposited in the Zoologisch Museum, Univ. of Amsterdam. The specimen is in good condition with its abdomen dissected and kept in a genitalia vial.

**Distribution**: Since the distribution range provided in the original description was rough (“Indes Orientales”), I restrict its range only to the neotype locality (Sumatra).

**Remarks**: In the recent phylogenetic analysis of the genus *Vidalia* (as *Pseudina*), no specimen was available for *V. impressifrons* (Han et al. 1994b). Nevertheless, they suggested that *V. impressifrons* (as *P. quadricornis*) might belong to the *bicolor* group based on Hardy’s (1987) note that it was closely related to *V. bicolor*. Han et al. (1994b) defined the *bicolor* group based on the following 3 synapomorphies: 1) distiphalliac glans without median granulate sclerite; 2) serration on the female aculeus reduced to only 2 pairs of strong subapical denticles; and 3) possession of 2 spermathecae. A detailed examina-

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**Figs. 2-6.** *Vidalia impressifrons* Robineau-Desvoidy, neotype ♀: 2, head, lateral view; 3, epandrium and surstyli, posterior view (proctiger removed); 4, epandrium, surstyli, and proctiger, lateral view; 5, ejaculatory apodeme; 6, glans, dorsolateral view.

**Fig. 7.** *Vidalia impressifrons* Robineau-Desvoidy, neotype ♀.

**Fig. 8.** Original labels of the holotype of *Vidalia quadricornis* Meijere (= neotype of *Vidalia impressifrons* Robineau-Desvoidy).
tion of the male neotype of *V. impressifrons* revealed that it did not have the proposed male synapomorphy of the *bicolor* group (above character 1), but instead possessed the synapomorphy of the *bidens* group: distiphallus with the enlarged apical membrane (Fig. 6). Even though the 2 female synapomorphies (characters 2 and 3 above) could not be confirmed, possessing the median granulate sclerite (Fig. 6) alone appears significant enough to remove this species from the *bicolor* group. This plesiomorphic state is such a complex structure that it is unlikely to have evolved again after once having been lost (apomorphous state).

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**REFERENCES**

果實蠅科 *Vidalia* 屬模式種 *V. impressifrons* 的再描述，並記述其分類與系統學

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果實蠅科 *Vidalia* 屬及其模式種 *V. impressifrons* 的分類地位過去一直令人相當地困惑，直到 1999 年重新指定了 *V. impressifrons* 的新模後才獲得解決。為了使新模的指定更為完整，本研究藉由對一隻新模式詳細的特徵檢查，對此新模加以重新描述、繪圖並陳述其特徵。本研究亦探討本科在 *Vidalia* 屬內和親緣位置。

關鍵詞：雙翅目，果實蠅科，*Vidalia impressifrons*，新模。

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