Preliminary Classification of the *Nigriventris*-complex of the Genus *Leucophenga* Mik, Having Sexually Dimorphic Palpi (Diptera, Drosophilidae)

By

Toyohi Okada

(Department of Biology, Tokyo Metropolitan University)

触鬚に二形のあるコガネショウジョウバエ属ニグリベントリス群の分類予報（双翅目，ショウジョウバエ科）

岡田豊日

（東京都立大学理学部生物学教室）

動物分類学会誌　6号別刷

昭和45年(1970)10月1日発行

Reprinted from

Proceeding of The Japanese Society of Systematic Zoology

No. 6 (1970, October)

Preliminary Classification of the *Nigriventris*-complex of the Genus *Leucophenga* Mik, Having Sexually Dimorphic Palpi (Diptera, Drosophilidae)

By
Toyohi Okada
(Department of Biology, Tokyo Metropolitan University)

触鬚に二形のあるコガネショウジョウバエ属ニグリベントリス群の分類予報（双翅目，ショウジョウバエ科）

岡田豊日
（東京都立大学理学部生物学教室）

The *nigriventris*-complex, here designated, of the genus *Leucophenga* Mik, 1868, comprises those species characteristic in showing a remarkable sexual dimorphism in the palpi (Fig. 1), which together with a considerable variability of the abdominal colour patterns (Fig. 2) and difficulty in obtaining offsprings in laboratory has brought much confusion in classifying and identifying the species involved.

Wheeler and Takada (1964: 239) explicitly distinguished the male and female of *L. nigriventris* Duda, nominate species of the *nigriventris*-complex, which shows a distinct sexual dimorphism in the abdominal patterns as well as in the palpi. Having given suggestion by their work, the present author intends to preliminarily classify the species, which are thought to belong to this complex, basing on various morphological characteristics including some hitherto overlooked.

One of the features seemingly characteristic to or, so far as known, exclusively

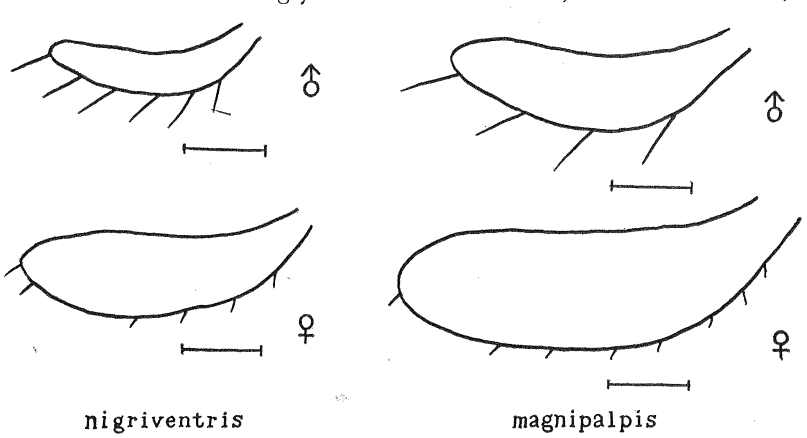

Fig. 1. Sexual dimorphism in the palpi. Scales 0.1 mm.

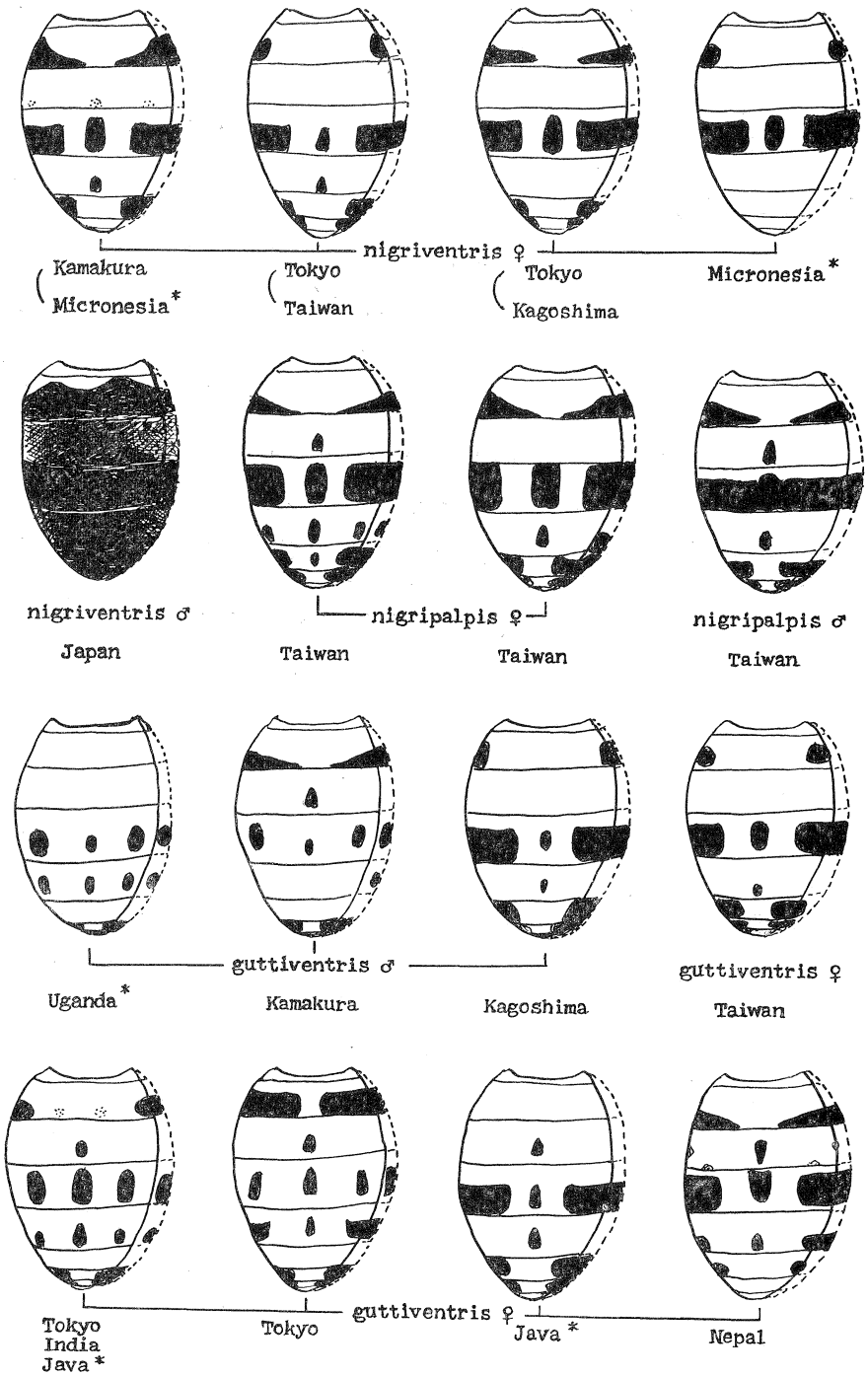

Fig. 2. Variation of the colour patterns of abdominal tergites.
(* adapted from literature.)

occurring in this complex is the hyaline caudal border of male anal plate, which might prove the complex to be a natural group. On the contrary, the abdominal patterns are considerably variable among specimens of the same sex and species collected together, or closely similar patterns occur between the same or different sexes of different species (Fig. 2). Thus, great care is needed to use this character for classifying and identifying the species.

The *Nigriventris*-complex

Palpi showing a remarkable sexual dimorphism, very large, broad, and with merely minute setulae in females, small, slender, and with a few long setae in males (Fig. 1). Anal plate of males with, so far as known, a hyaline non-pubescent caudal border.

Diagnostic Characters of the Species in Two-state Coding

A. Palpi black (0) or yellowish to reddish brown (1).

B. Male abdominal tergites nearly entirely black (0) or yellow with black spots (1) (Fig. 2).

C. Scutellum uniformly yellow (0) or dark brown to black with white apex (1).

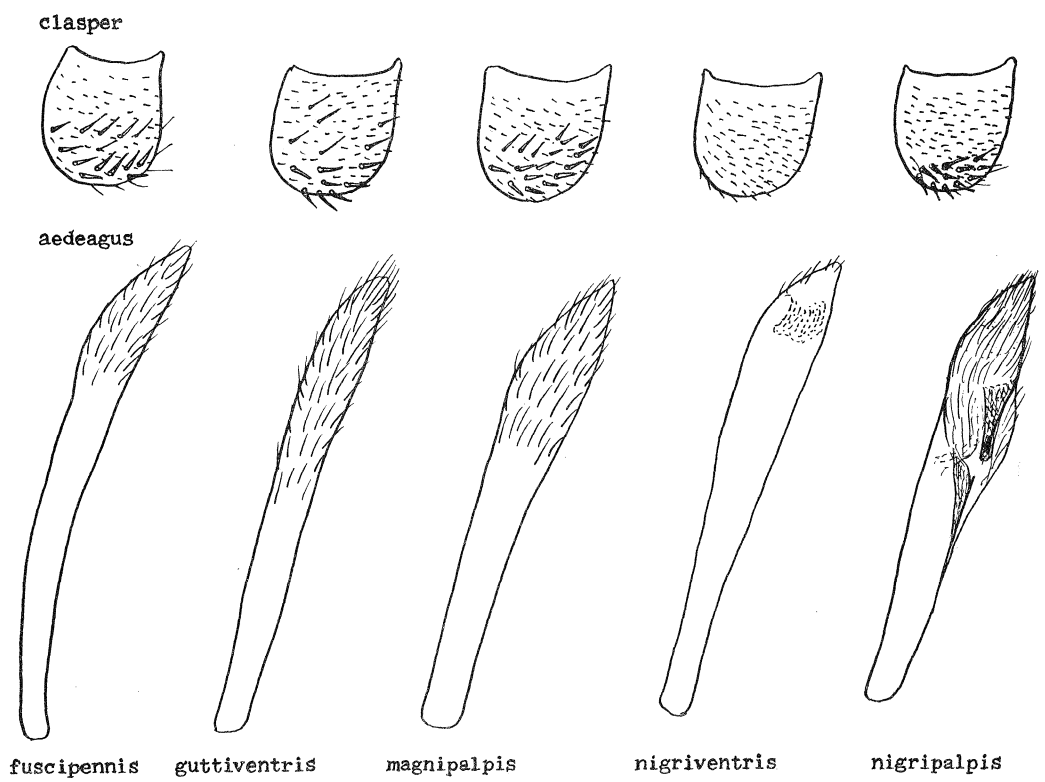

Fig. 3. Clasper and aedeagus.

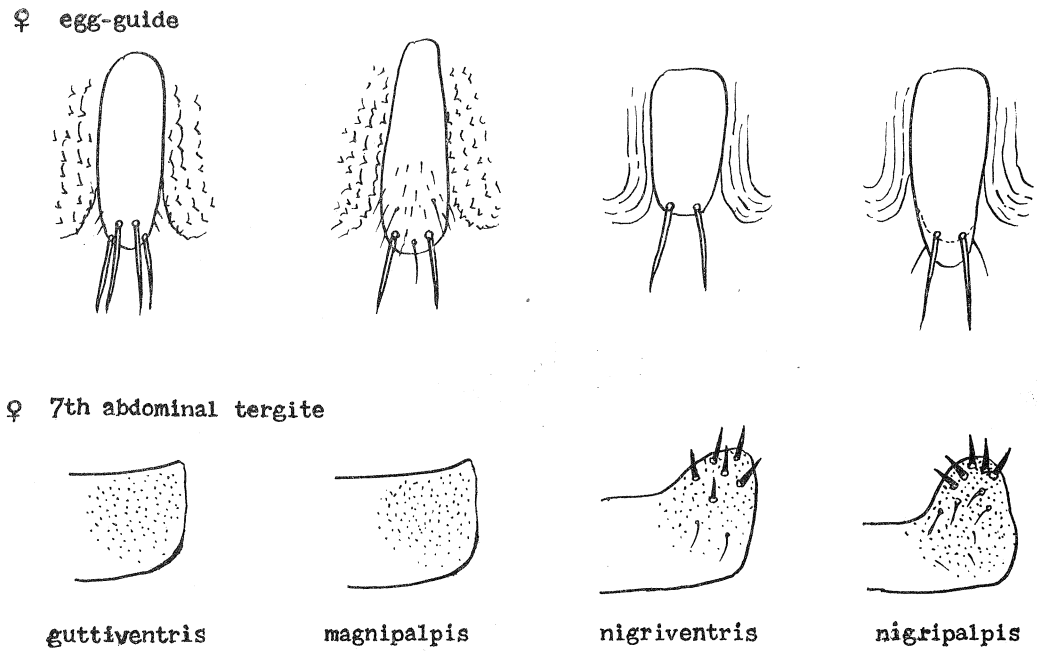

Fig. 4. Egg-guide and female seventh abdominal tergite.

D. Mesopleura with black stripes or patches (0), or uniformly yellowish brown (1).

E. Wings hyaline (0) or fuscous (1).

F. Third abdominal tergites of female with a large median black spot (0) or with or without a small one (1).

G. Male clasper with (0) or without (1) stout bristles (Fig. 3).

H. Aedeagus hairy at least on distal one-third (0) or only apically hairy (1) (Fig. 3).

I. Seventh abdominal tergites of female with several stout bristle at anterolateral corners (0), or without such bristles (1) (Fig. 4).

J. The pleural membrane surrounding egg-guide with numerous fine spicules (0), or without such spicules (1) (Fig. 4).

Clustering

The distribution of the character states of these ten diagnostic characters in the species actually examined by the author himself together with two (with *) described and figured in detail by Wheeler and Takada (1964) is as listed below.

From this character-state diagram a phenogram to show phenetic relationships of these species is obtained by the similarity coefficient MCD (=u/n, where, u is number of unmatches, n is number of species), and clustering method UPGA (Unweighted Pair-group Analysis using average linkage) (Fig. 5). The phenogram shows that *magnipalpis* is identical with *nigroscutellata* in terms of the characters applied. In deed, the both species are thought by Duda (1923: 28) to be identical, representing female and male

Species	Characters A	B	C	D	E	F	G	H	I	J
nigriventris	1	0	0	1	0	1	1	1	0	1
guttiventris	1	1	0	1	0	1	0	0	1	0
nigripalpis	0	1	0	1	0	1	0	0	0	1
magnipalpis	0	1	1	0	0	0	0	0	1	0
nigroscutellata	0	1	1	0	0	0	0	0	NC	NC
fuscipennis	1	1	0	1	1	1	0	0	NC	NC
*boninensis**	1	1	0	0	0	0	0	0	NC	NC
*ponapensis**	0	0	0	0	0	0	0	1	NC	NC

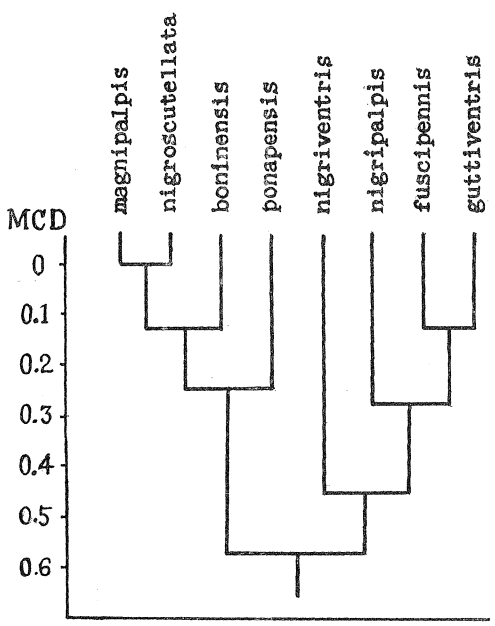

Fig. 5. A phenogram based on MCD and UPGA.

of one and the same species. By the way, it should be noticed that the original forms of these two species described by DUDA (1923) from Taiwan have nearly entirely black abdomens, different from those treated here, which are also of Taiwan and have spotted abdomens. The phenogram shows also that *fuscipennis* is close to *guttiventris*, the result being coincident with DUDA's opinions that the former may be a variety of (1939 : 52) or identical with (1923 : 28) the latter.

A Tentative List of the Species of the *Nigriventris*-complex, with Remarks on Distribution and Synonymy

As the first approximation, seventeen species listed below are involved in this complex, eight from Oriental region including Pacific area, eight from Ethiopian region, and one covering both regions.

L. boninensis WHEELER and TAKADA, 1964 : 231 (Bonin Is., Guam, ♂, ♀).

L. fuscipennis DUDA, 1923 : 28 (Taiwan, ♂).

L. goodi KAHL, 1917. Annal. Carneg. Mus. 11 : 338 (West Africa, ♀?); DUDA, 1939 : 27. *L. nigroscutellata* DUDA may be identical.

L. guro BURLA, 1954. Rev. Suis. Zool. 61 : 35 (Ivory Coast, ♀).

L. grossipalpis (LAMB, 1914). Trans. Linn. Soc. 2nd ser. 16 : 328 (*Drosophila*) (Seychelles, ♀).

L. guttiventris (DE MEIJERE, 1911). Tijd. Ent. 54 : 414 (*Drosophila*) (Java, ♀?), new name

for *D. maculiventris* (de Meijere, 1908). Tijd. Ent. 51: 155 (preoccupied). Further distibution: Honshu, Kyushu, Taiwan, India, Nepal, Africa, Fiji ?, ♂, ♀.

L. latevittata Duda, 1939: 48 (Uganda, ♂, ♀).

L. magnipalpis Duda, 1923: 27 (Taiwan, ♀), probably ♀ of *nigroscutellata* Duda. Further distr.: Kyushu, Shikoku, Honshu, Hokkaido, Korea, ♂, ♀.

L. mansura (Adams, 1905). Kansas Univ. Sci. Bull. 3: 185 (*Drosophila*) (Rhodesia, ♀).

L. nigriventris (Macquart, 1842). Dipt. Exot. 2(3): 259 (*Drosophila*) (Viet-Nam, ♂?); Syn. *L. angusta* Okada, 1956. Syst. Study: 28 (Honshu, ♂), synonymy confirmed here by close examination of genitalia); *L. guttiventris*: Okada, 1956, Syst. Study: 27, pro. part. (♀) (nec de Meijere), as suggested by Wheeler and Takada (1964: 229). Further distr.: Java, Taiwan, Okinawa, Kyushu (Amami, Yaku, Kirishima), Honshu (south to Tokyo), Korea, Guam, Plau, Yap, New Guinea ? ♂, ♀. The New Guinean specimens preserved at the University of Texas, Austin, tentatively assorted to this species by the author.

L. nigripalpis Duda, 1923: 29 (Taiwan, ♂); a Nepalese specimen identified by the author (1966: 28) to this species certainly be *nigriventris*, despite having black palpi; ♂ and ♀ from Taiwan examined in the present study with better demarcated abdominal spots than in the original form.

L. nigroscutellata Duda, 1924. Arch. Naturg. 90A3: 186: 237 (Taiwan, ♂); ? nec *nigroscutellata*: Okada, 1966: 34 (Nepal, ♂), misidentified, not belonging to this complex.

L. palpalis (Adams, 1905). Kansas Univ. Sci. Bull. 3: 185 (*Drosophila*) (Rhodesia, ♂).

L. ponapensis Wheeler and Takada, 1964: 232 (Ponape ♂, ♀).

L. tritaeniata Duda, 1923: 26 (New Guinea, ♀).

L. yaure Burla, 1954. Rev. Suis. Zool. 61: 34 (Ivory Coast, ♀).

L. zonata Curran, 1939. Amer. Mus. Novit. 1030: 2 (Rhodesia, ♀).

Key to Species of the *Guttiventris*-complex

1.	Palpi black	2
—	Palpi yellowish or reddish brown	9
2.	Mesopleura with black patches or stripes	3
—	Mesopleura without black patches or stripes	6
3.	Mesopleura with broad black stripe	*boninensis*
—	Mesopleura with black patches	4
4.	Scutellum unicolorous; costa not blackened	*ponapensis*
—	Scutellum not unicolorous; costa more or less blackened	5
5.	Scutellum black, apically white	*nigroscutellata, goodi, magnipalpis*
—	Scutellum dark brown, laterally black, apically white	*magnipalpis* (Northern form)
6.	Scutellum unicolorous	*yaure*
—	Scutellum apically white	7
7.	Abdominal tergites centrally and caudally yellow	*palpalis*

— Abdominal tergites more or less distinctly spotted 8
8. Fifth abdominal tergite distally black ..... *latevittata*
— Fifth abdominal tergite distally not black ..... *nigripalpis*
9. Wings with prominent black bands; scutellum black, apically white ..... *tritaeniata*
— Wings without black bands 10
10. Wings fuscous 11
— Wings hyaline 12
11. Scutellum uniformly yellowish brown ..... *fuscipennis*
— Scutellum apically white ..... *zonata*
12. Abdominal tergites (♀) mostly black ..... *guro*
— Abdominal tergites (♀) banded or spotted 13
13. Abdominal tergites (♀) banded ..... *mansura*
— Abdominal tergites (♀) spotted 14
14. Costa blackened ..... *grossipalpis*
— Costa not distinctly blackened 15
15. Abdominal tergites mostly black in male; female seventh abdominal tergite anterolaterally with stout black bristles ..... *nigriventris*
— Abdominal tergites spotted in both sexes; female seventh abdominal tergite anterolaterally without stout bristles ..... *guttiventris*

Summary

The *nigriventris*-comples of the genus *Leucophenga* Mik is established for those species having palpi of a remarkable sexual dimorphism. One of the components of the male genitalia is found to be characteristic to this complex. On the contrary, the abdominal colour patterns are found considerably variable and in general hardly applicable for identiying the species. A preliminary classification of the species thought to belong to this complex is attempted and a tentative key to these species is given.

Acknowledgement

The author's cordial thanks are due to Dr. M. R. Wheeler of the Texas University, Austin, Texas, for his advices in taxonomic accounts, and to Dr. D. Moriwaki of the National Institute of Genetics, Mishima, Dr. S. P. Ray-Chaudhuri of Banaras Hindu University, Varanasi, Dr. L. H. Throckmorton of the University of Chicago, Chicago, Dr. T. Shirozu of Kyushu University, Fukuoka, and Dr. Y. Hirashima of the same University, for their helps in gathering specimens.

Literature

Duda, O., 1923. Die orientalischen und australischen Drosophiliden-Arten (Dipteren) des Ungarischen National-Museum zu Budapest. *Annls. Mus. Nat. hung.*, 20: 24–59.
Duda, O., 1939. Revision der afrikanischen Drosophiliden (Diptera). I. *Ibid.*, 32: 1–57.
Okada, T., 1966. Diptera from Nepal. Cryptochaetidae, Diastatidae & Drosophilidae. *Bull. Brit. Mus. (NH).* Suppl., 6: 1–129.
Wheeler, M. R. & H. Takada, 1964. Diptera; Drosophilidae. *Insects of Micronesia*, 14(6): 163–242.