

Studies on the Indian fauna of Drosophilidae

O P SINGH and J P GUPTA

Genetics Laboratory, Department of Zoology, Banaras Hindu University,
Varanasi 221 005, India

MS received 12 May 1980 ; revised 21 October 1980

Abstract. Taxonomic account of three species representing three different genera of the family Drosophilidae is presented. Two of them, *Leucophenga rimbickana* and *Nesiodrosophila pleurostriata* are described as new, while *Stegana shirozui* Okada is recorded for the first time from India. A list of Indian species of Drosophilidae excluding the genus *Drosophila* is also given.

Keywords. Drosophilidae ; *Leucophenga rimbickana* ; *Nesiodrosophila pleurostriata* ; *Stegana shirozui*.

1. Introduction

In recent years, studies on the systematics of Indian Drosophilidae have accumulated large data on *Drosophila* species, but our knowledge regarding allied genera of Drosophilidae is very meagre. However, a few papers have been published on this subject to date, comprising altogether 38 species representing 17 genera of the family Drosophilidae excluding the genus *Drosophila* (Malloch 1924; Parshad and Duggal 1965; Gupta 1970, 1974; Jha *et al* 1971; Reddy and Krishnamurthy 1971, 1973-74; Godbole and Vaidya 1972, 1973; Bächli 1973; Vaidya and Godbole 1973, 1976; Singh and Gupta 1974; Sajjan and Krishnamurthy 1975; Singh 1976; Dwivedi and Gupta 1979; Dwivedi *et al* 1979).

In the present paper a list of Indian Drosophilidae (excluding members of the genus *Drosophila*) in addition to the description of two new and one known species is given (see Table 1).

2. Taxonomic descriptions

2.1. Genus *Leucophenga* Mik.

Leucophenga Mik 1886; Wiener Ent. Zeitung 5: 317. Type-species: *Drosophila maculata* Dufour, Europe; Duda 1924, Arch. Naturgesch A, 90 (3): 185.

Table 1. List of Indian Drosophilidae (Excluding *Drosophila* species).*Amiota* Loew*shillongensis* Singh and Gupta, 1979*Cacoxenus* Loew*punctatus* Duda, 1924, Syn. of *Gitonides perspicax* Knab, 1914. Ref. Mac Alpine, 1968, Canad. Ent., 100 (5) : 514*Chymomyza* Czerny*vaidyai* Okada, 1976 : Nom. nov. for *Chymomyza pararufithorax* Vaidya and Godbole, 1973, DIS, 50 : 71.*Curtonotum* Macquart*neoangustipennis* Dwivedi and Gupta, 1979*Gitonides* Knab*perspicax* Knab, 1914*Hypselothyrea* de Meijere*guttata* Duda, 1926*varanasiensis* Gupta, 1974*Leucophenga* Mik*albicincta* (de Meijere, 1908)*flavicosta* Duda, 1926*gutiventris* (de Meijere, 1911)*interrupta* Duda, 1924*neoangusta* Vaidya and Godbole, 1976*rinbickana*, sp. nov.*shillongensis* Dwivedi and Gupta, 1979*subpollinosa* (de Meijere, 1914)*Liodrosophila* Duda*angulata* Dwivedi and Gupta, 1979*okadai* Dwivedi and Gupta, 1979*Penispinosa* Dwivedi and Gupta, 1979*rufa* Okada, 1974*Lissocephala* Malloch*metallescens* (de Meijere, 1914)*sabroskyi* Wheeler and Takada, 1964*Microdrosophila* Malloch*purpurata* Okada, 1956*Mycodrosophila* Oldenberg*gratiosa* (de Meijere, 1911)*Nesiodrosophila* Wheeler and Takada*pleurostriata*, sp. nov.*Paraleucophenga* Hendel*invicta* (Walker, 1857)*Scaptomyza* Hardy*cristata* Singh, 1976*elmoi* Takada, 1970*graminum* (Fallen, 1823)*pallida* (Zetterstedt, 1847)*plumata* Singh, 1976

Sinophthalmus Coquillett Syn. of subgenus *Erima* Kerte'sz of genus *Amiota* Loew. Ref. Okada, 1971, Kontôu 39 : 83.
creberii Singh, 1976
pictus Coquillett, 1904

Stegana Meigen
shirozui Okada, 1971 (New record)
subexcavata Vaidya and Godbole, 1976

Zaprionus Coquillett
indiana Gupta, 1970
multistriata Sturtevant, 1927
paravittiger Godbole and Vaidya, 1972
striata Nirmala Sajjan and Krishnamurthy, 1975

2.2. *Leucophenga rimbickana* sp. nov.

Head, ♂ and ♀ : Arista with 5 dorsal and 1 ventral branches in addition to small terminal fork. Antennae with second segment pale brown; third segment yellow. Frons yellowish brown, ocellar triangle black. Orbitals in ratio of 6:5:9, anterior reclinate orbital closer to proclinate. Vibrissa well-developed, second oral not differentiated. Palpi yellow, slender, with one apical and 3-4 ventral setae. Carina brownish, low and broad below. Face and cheek pale, greatest width of cheek one-tenth greatest diameter of eye. Clypeus dark brown. Eyes bright red.

Thorax, ♂ and ♀ : Acrostichal hairs in about ten irregular rows. Anterior scutellars parallel; posterior crossing each other. Anterior dorsocentral two-fifth the length of posterior dorsocentral; distance between anterior and posterior dorsocentral one-third of distance between two anterior dorsocentrals. Mesonotum tan, with a large brown patch above. Scutellum dark brown, apex yellow. Thoracic pleura yellow, with scattered black patches on sternopleura, hypopleura and pteropleura. Sterno-index about 0.75. Legs straw yellow, preapicals on all tibiae; apicals on mid and hind tibiae.

Abdomen, ♂ and ♀ : Abdominal tergites yellow with a pattern of dark areas (figure 5) : 1 T yellow; 2 T with one black spot on each side; 3 T entirely black; 4-5 Ts in ♀ with bands projected anteriorly at middle and each lateral side, while in ♂ only 5T; and the remainder in both sexes completely black.

Wings, ♂ and ♀ (figure 4) : Dusky. C_1 bristles two, unequal; C_3 bristles on basal about two-third of third costal section. Indices : C-index 2.86; 4V-index 1.85; 4C-index 0.98; 5X-index 1.44. Halteres yellow.

Average length of wing : 3.15 mm (♂); 3.4 mm (♀)

Average length of body : 3.04 mm (♂); 3.35 mm (♀).

Periphallalic organs (figure 1) : Genital arch (Epandrium) yellowish orange, broad, pubescent, with elongated fragma proximally and broadly truncate below, with about 10 upper and 6 lower marginal bristles. Clasper (Surstylus) large, slightly longer than broad, with 25 fine setae and numerous microtrichia. Anal plate (Cerci) pubescent, elongate and narrowly extended ventrally, and with 22 large bristles.

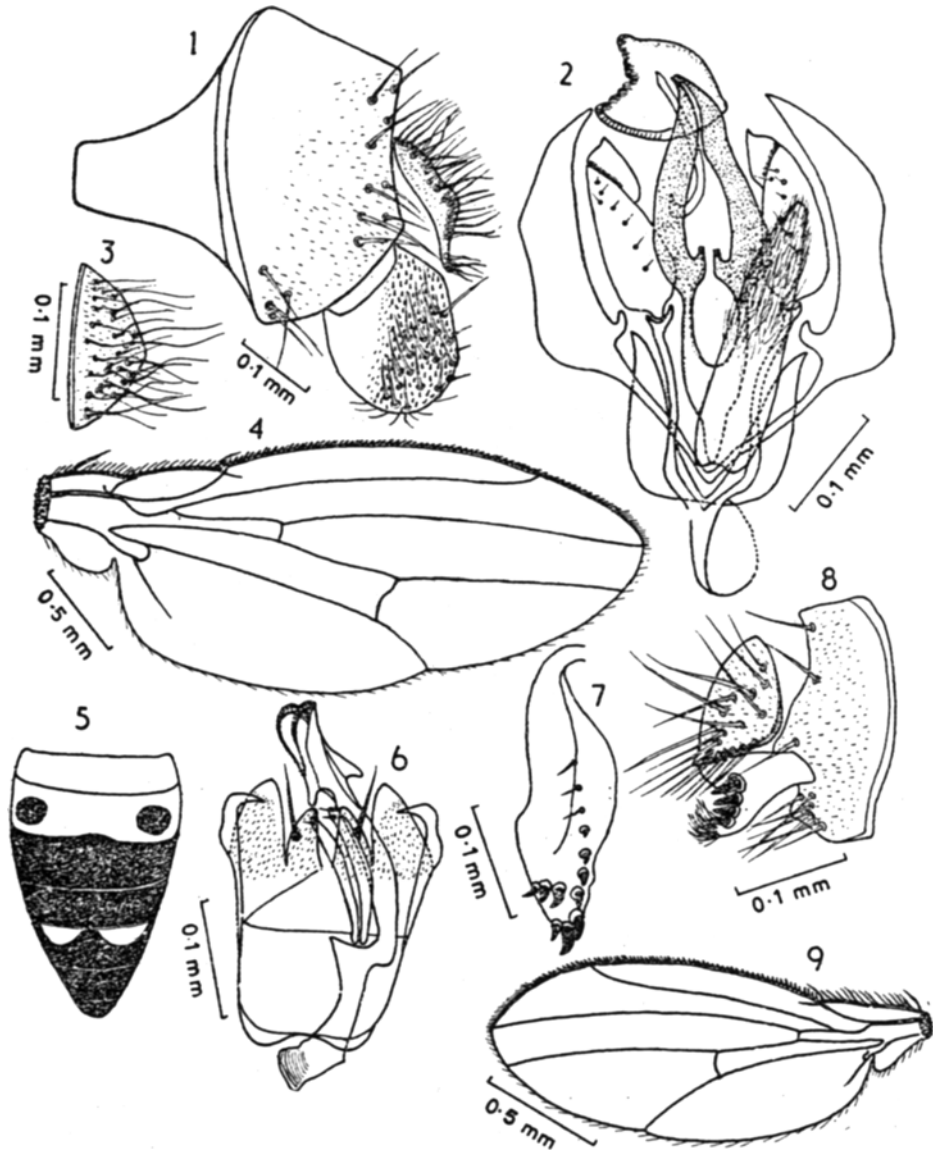
Phallic organs (figure 2) : Aedeagus black, elongate, bifid, with a short basal apodeme; ventral recurved process long, apically narrowing and hairy. Anterior

parameres (anterior gonopophyses) long and broad, with a longitudinal row of 7 sensilla at middle. Posterior parameres (posterior gonopophyses) fused to form a somewhat triangular lobe. Ventral fragma broad proximally.

Egg-guides (figure 3): Lobe pale yellow, completely fused, pubescent and with 4-5 long marginal bristles.

Holotype ♂, India : Rimbick, Darjeeling district, West Bengal, September 1979, Colls. Singh and Gupta.

Paratypes: 6 ♂♂, 5 ♀♀, Collection data same as holotype.



Figures 1-9. 1-5. *Leucophenga rimbickana* sp. nov. 1. Periphallallic organs. 2. Phallic organs. 3. Egg-guide. 4. Male wing. 5. Male abdomen. 6-9. *Nesiodrosophila pleurostriata* sp. nov. 6. Phallic organs. 7. Egg-guide. 8. Periphallallic organs. 9. Male wing.

All type specimens are at present deposited in the Museum, Department of Zoology, Banaras Hindu University, Varanasi, India. 1 ♂ and 2 ♀♀ from the paratype series are also deposited in the "*Drosophila* collection" of Department of Biology, Tokyo Metropolitan University, Setagaya-Ku, Tokyo, Japan.

Relationships: This species closely resembles *L. nigriceps* Okada in having similar number of arista branches, thoracic pleura with scattered black patches, anterior reclinate orbital closer to proclinate and also with one prominent oral bristle, but differs from it in having a different abdominal pattern, mid and hind knees yellow and the clasper with numerous fine setae.

Distribution: India.

2.3. Genus *Nesiodrosophila* Wheeler and Takada

Nesiodrosophila wheeler and Takada 1964, Ins. Micronesia 14(6): 238. Type species: *Nesiodrosophila lindae* Wheeler and Takada; Caroline Is. (Palau).

2.4. *Nesiodrosophila pleurostriata* sp. nov.

Head, ♂ and ♀: Arista with 3–4 dorsal and 1 ventral branches in addition to terminal fork. Antennae with second segment pale; third segment yellow. Frons including ocellar triangle tan. Orbitals in ratio of 5:3:6, anterior reclinate closer to proclinate than to posterior reclinate. Second oral thin, about two-fifth of vibrissa. Palpi dull tan, with one prominent apical seta. Carina tan and flat. Face and cheek pale, greatest width of cheek one-seventh greatest diameter of eye. Clypeus brown. Eyes dark red.

Thorax, ♂ and ♀: Acrostichal hairs in six regular rows above dorsocentrals. Anterior scutellars divergent; posterior ones crossing each other. Distance between anterior and posterior dorsocentral two-third of distance between two anterior dorsocentrals. Mesonotum pale yellow, scutellum little darker. Thoracic pleura yellow, with two dark brown longitudinal stripes, upper one broad. Stern-index about 0.4. Legs yellow, preapicals on all three tibiae; apicals on fore and mid tibiae.

Abdomen, ♂ and ♀: Abdominal tergites with broad dark brown apical bands.

Wings, ♂ and ♀ (figure 9): Clear. C_1 bristles two; C_3 bristles on basal half of third costal section. Indices: C-Index 2.14; 4V-index 2.53; 4C-index 1.32; 5X-index 3.34. Halteres yellow, upper surface of stalk brown.

Average length of wing: 1.72 mm (♂); 1.8 mm (♀)

Average length of body: 1.58 mm (♂); 1.79 mm (♀).

Periphallic organs (figure 8): Genital arch (Epandrium) broad at middle, yellowish brown, pubescent, upper portion with 3 and lower with 9–10 bristles. Clasper (Surstylus) large, quadrate, apically little broad, with four stout large teeth and several small ventral setae. Anal plate (Cerci) triangular, orange brown, pubescent, and with about 20 bristles.

Phallic organs (figure 6): Aedeagus pale orange, rod shaped, curved, subapically somewhat swollen and apically with fine serrations. Basal apodeme half the length of aedeagus. Anterior parameres (anterior gonopophyses) narrow and elongate, pale yellow, each with two minute sensilla apically. Hypandrium has a pair of long conical processes with a pair of large submedian spines. Ventral fragma nearly quadrate.

Egg-guides (figure 7): Lobe somewhat fusiform, yellowish brown, with about 10 marginal and 3 discal stout black teeth. Penultimate marginal tooth largest. Basal isthmus narrow and short.

Holotype ♂, India: Rimbick, Darjeeling District, West Bengal, September 1979, Colls. Singh and Gupta.

Paratypes: 3 ♂♂, 8 ♀♀, collection data same as holotype.

All type specimens are at present deposited in the Museum, Department of Zoology, Banaras Hindu University, Varanasi, India. 1 ♂ and 2 ♀♀ from the paratype series are also deposited in the "*Drosophila* collection" of the Department of Biology, Tokyo Metropolitan University, Setagaya-Ku, Tokyo, Japan.

Relationships: This species superficially resembles *Nesiodrosophila raridentata* Okada and Chung (= *Drosophila raridentata* Okada and Chung, 1960 as cited by Takada, Beppu and Toda 1979) but distinctly differs from it in having no process corresponding to secondary clasper (secondary clasper present in *N. raridentata*), narrow and elongate anterior parameres with 2 apical sensilla (anterior parameres large, quadrate, with one apical and 2 basal sensilla in *N. raridentata*) and arista with 3-4 dorsal and 1 ventral branches (5 dorsal and 2 ventral branches in *N. raridentata*).

Distribution: India.

Note: This genus is recorded for the first time from India.

2.5. Genus *Stegana* Meigen

Stegana Meigen 1830, Syst. Beschreib. 5: 79. Type-species: *Drosophila curvipennis* Fallen, 1823; Europe.

2.6. Subgenus *Steganina* Wheeler

Steganina Wheeler 1960, Proc. Entomol. Soc. of Washington, 62: 110. Type-species: *Musca coleoprata* Scopoli, 1763; Europe.

2.7. *Stegana* (*Steganina*) *Shirozui* Okada

Stegana shirozui Okada, 1971, Mushi 45 (5): 84.

Head, ♂: Arista with 5-6 dorsal and 3 ventral branches in addition to terminal fork. Orbitals in ratio of 3:2:4. Palpi yellow, with 4 ventral setae. Cheek yellowish orange, greatest width of cheek one-sixth greatest diameter of eye.

Thorax, ♂: Prescutellars well developed, one additional pair of bristles on either side of prescutellars present. Distance between anterior and posterior dorsocentral one-third of distance between two anterior dorsocentrals. Mesonotum (figure 12) shiny dark brown, with incomplete longitudinal yellow stripes along dorsocentral lines.

Wings, ♂ (figure 13): Dark brown, paler towards caudal margin. Indices: C-index 2.22; 4V-index 1.5; 4C-index 0.88; 5X-index 1.57. Other details as described by Okada (1971).

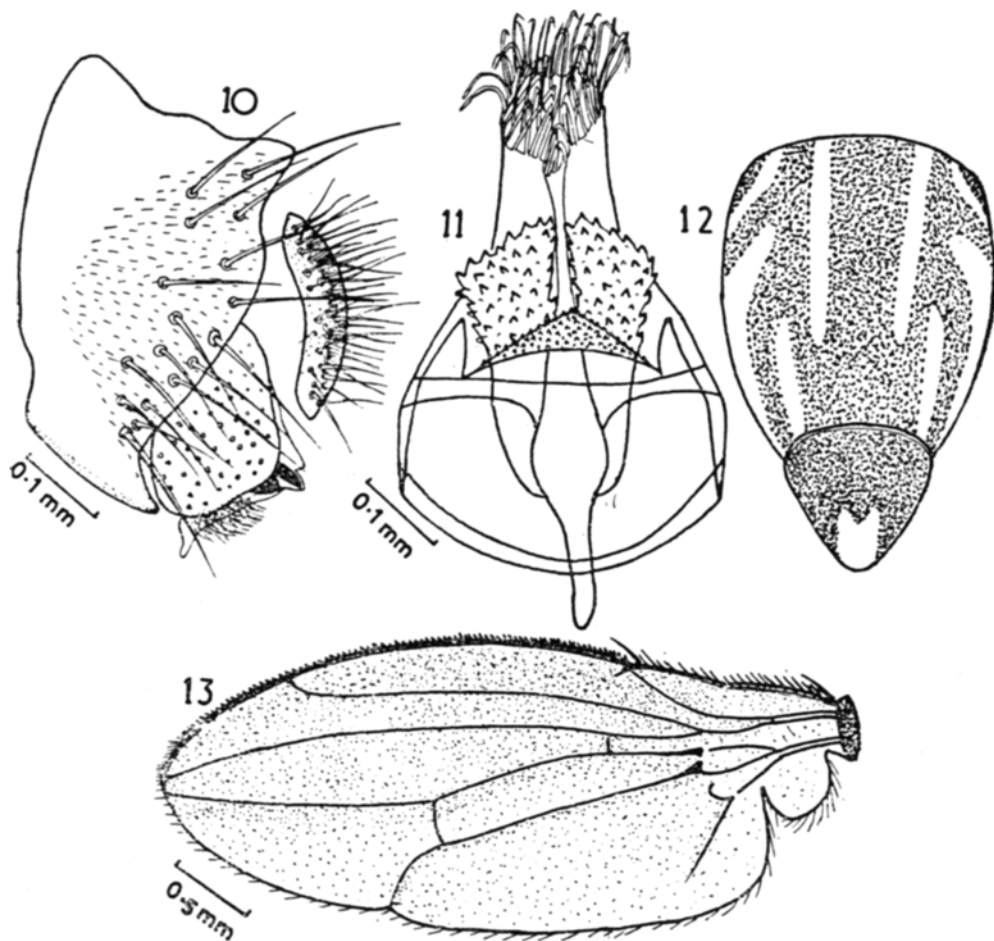
Periphallial organs (figure 10): Genital arch (Epandrium) dark brown, pubescent, dorsally broadened and narrowly projected ventrally, with 18 long bristles. Clasper (Surstylus) brown, quadrate, dorsally with numerous fine denticles, and with 2 black and 2 yellow teeth apically in addition to several fine ventral setae. Anal plate (Cerci) pale brown, elongate, with 32 bristles.

Phallic organs (figure 11): Aedeagus pale brown, straight, apically with hair crown, laterally with numerous conical projections. Basal apodeme of aedeagus short. Ventral fragma broadly rounded.

Specimens examined: 1 ♂, September 1979, Rimbick, Darjeeling district, West Bengal. Colls. Singh and Gupta.

Distribution: Taiwan and India (new record).

Remarks: The Indian strain of *Stegana shirozui* Okada slightly differs from its original form (Taiwan) in having arista with 5-6 dorsal and 3 ventral branches (6 dorsal and 4 ventral in Taiwanese form) and clasper with 2 black and 2 yellow instead of 3 black and 2 yellow in Taiwanese form. Other features strictly agree with those of the Taiwanese form.



Figures 10-13. *Stegana shirozui*. 10. Periphallic organs. 11. Phallic organs. 12. Male thorax. 13. Male wing.

Acknowledgements

The authors are grateful to Dr T Okada, Emeritus Professor, Department of Biology, Tokyo Metropolitan University, Tokyo, Japan, for extending his help in confirming the identifications and to Prof. J P Thapliyal, Head of Zoology Department, for providing laboratory facilities. Thanks are also due to the University Grants Commission for financial assistance.

References

- Bächli G 1973 Beitrag zur Kenntnis der Drosophiliden—Fauna (Diptera) des Kanha—National Parkes; *Vjschr. naturf. Ges. Zurich* **118** 23–30
- Dwivedi Y N and Gupta J P 1979 Three new Drosophilids (Diptera; Drosophilidae) from north east India; *Entomon.* **4** 183–187
- Dwivedi Y N, Singh B K and Gupta J P 1979 Further addition to the Indian fauna of Drosophilidae; *Orient. Insects* **13** 61–74
- Godbole N N and Vaidya V G 1972 A new species of Drosophilidae from Poona (India): *Zaprionus (Zaprionus) paravittiger* sp. nov.; *Drosophila Inform. Serv.* **48** 135–136
- Godbole N N and Vaidya V G 1973 Drosophilid survey of Mahabaleshwar; *Drosophila Inform. Serv.* **50** 141
- Gupta J P 1970 Description of a new species of *Phorticella, Zaprionus* (Drosophilidae) from India; *Proc. Indian Natl. Sci. Acad.* **B36** 62–70
- Gupta J P 1974 Indian species of Drosophilidae, exclusive of the genus *Drosophila*; *J. Entomol.* **43** 209–215
- Jha A P, Misra M and Singh V K 1971 Abnormal sex-ratio in Darjeeling *Drosophila* population; *Drosophila Inform. Serv.* **47** 98
- Malloch J R 1924 Two Drosophilidae from Coimbatore; *Mem. Dept. Agric. India* **8** 63–65
- Okada T and Chung Y J 1960 Three species of Drosophilidae from South Korea; *Akitu* **9** 25–30
- Parshad R and Duggal K K 1965 Drosophilidae of Kashmir, India; *Drosophila Inform. Serv.* **40** 44
- Reddy G S and Krishnamurthy N B 1971 Preliminary survey of Drosophilids in Nilgiris and Kodaikanal ranges; *Drosophila Inform. Serv.* **47** 116–117
- Reddy G S and Krishnamurthy N B 1973–74 Systematics and distribution of *Drosophila* fauna of South India; *J. Mysore Univ.* **B26** 54–64.
- Sajjan S N and Krishnamurthy N B 1975 Two new Drosophilids from South India (Diptera: Drosophilidae); *Orient. Insects* **9** 117–119
- Singh A 1976 Descriptions of new species of the genera *Sinophthalmus* and *Scaptomyza* (Insecta: Diptera: Drosophilidae) from Chandigarh, India; *Rec. Zool. Surv. India* **69** 187–202
- Singh B K and Gupta J P 1974 The genus *Leucophenga* (Diptera: Drosophilidae) in India; *Indian J. Zootom.* **15** 23–26
- Takada H, Beppu K and Toda M J 1979 *Drosophila* survey of Hokkaido XXXVI. New and unrecorded species of Drosophilidae (Diptera); *J. Fact. General Edn. Sapporo Univ.* **14** 105–128
- Vaidya V G and Godbole N N 1973 First report of genus *Chymomyza* (Drosophilidae) from India: *Chymomyza pararufithorax* sp. nov.; *Drosophila Inform. Serv.* **50** 71–72
- Vaidya V G and Godbole N N 1976 Systematic study of Drosophilidae in Poona and Neighbouring areas IV; *J. Univ. Poona Sci. Tech.* **48** 85–92