STUDIES ON INDIAN ITONIDIDAE (CECIDOMYIDAE: DIPTERA).

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(PLATE VII.)

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INTRODUCTION.

The Itonididae, gall midges or gall gnats, generally known as the Cecidomyidae, are a very large family of small Nemocerate Diptera of world-wide distribution. They are well-known for the galls or similar deformities which they produce on various kinds of plants. The family comprises over three thousand species, distributed over four hundred genera of small, slender, soft-bodied flies, ranging in length from 0·5 mm. or even less to 8·0 mm., usually with broad wings and relatively long antennae. The tibiae are unarmed apically, the coxae are not produced and the wings usually have but three or four long veins. Except in the more generalised forms, ocelli are absent. They are closely related to the family Mycetophilidae, from which they are distinguished by the shorter coxae, the absence of apical tibial spurs and fewer veins in the wings. From the other allied families, Culicidae and Chironomidae, of the Nemocerate Diptera, they differ in not having aquatic larvae, in the unscaled wing veins and in the non-plumose male antennae.

They lay eggs on various kinds of plants and the minute apodous larvae hatching from them attack vegetable tissues resulting in the

formation of excrescences or galls. The larvae derive both shelter and nourishment from the vegetable tissues and except in some genera most of them pupate in the gall itself. A considerable number of midges, however, do not produce galls on plants and many more live on decaying vegetable matter. Several species are also known to be zoophagous, attacking other gall midges, mites, scale-insects, plant-lice, Psyllids, etc.

Several of the gall midges are of great economic importance and include both beneficial and injurious species. Some seed-infesting forms are materially useful in checking the spread of undesirable or injurious plants on cultivated lands (127). *Asphondylia opuntiae* Felt, for instance, has in America completely eradicated a species of *Cactus*, a serious pest of agricultural lands in many parts of the world. Another notorious pest of America, the Canada Thistle, has also been eradicated by the midge, *Dasyneura gibsoni* Felt. Among the injurious species, the Hessian Fly, *Phytophaga destructor* Say, is a very serious pest. It is stated that the estimated loss, due to this fly, in wheat cultivation in New York State, was $3,000,000 in a single year. Pear midge, clover midge, rose midge, willow midge, chrysanthemum midge and many others are also serious pests of numerous cultivated plants in Europe and America. The Paddy silver-shoot gall midge has often caused considerable damage in rice plantations in many parts of South India. The damage in kitchen gardens due to the Bitter-gourd vine gall fly, *Lasioptera falcata* Felt, is sometimes very great. Their zoophagous habits, however, make them at times a friend of the agriculturist, as they attack and effectively check the spread of the injurious aphids, scale-insects, etc., on which they feed.

Gall midges have been known from very early times. Pliny, Malpigh[i] and Reaumer seem to have been acquainted with them. Linnaeus and De Geer described them as *Tipula*. Fabricius classed them as *Chironomus*. It was only in 1800, when Meigen (129) published his *Nouvelle Classification des mouches a deaux ailes* (Diptera L.) *d' apres un plan tout nouveau*, and erected the genus *Itonida* Meig., that their true position was made known. Three years later Meigen (130) published diagnoses of a number of genera already described in 1800 but gave new names to almost all of them. In this work the genus *Cecidomyia* Meig. was erected and the name Cecidomyidae proposed for the family, with *Tipula pini* D. G. as the genotype. For years there was disagreement as to the exact position of *Cecidomyia* Meig. and in 1850 Loew (120), to avoid confusion, proposed the generic name *Diplosis* H. Loew. In the year 1805 Latreille (115) created the genus *Oligotrophus* Lat. In 1818, Meigen (131) erected the genus *Lasioptera* Meig. Rondani (147) divided the family into the sub-families Lestremiinae and Cecidomyinae. In 1908, Hendel (84) republished the " Nouvelle Classification " of Meigen (129) and suggested that as the descriptions corresponded more or less closely with those in Meigen's 1803 paper (130), the earlier set of names should be given priority over those of 1803 in general use. The decision of the International Commission on Zoological Nomenclature also agreeing with this view, the name *Cecidomyia* Meig. was replaced by the earlier *Itonida* Meig. Since then a satisfactory classification has been worked out by such well-known specialists as Rubsaamen, Kieffer and Felt. In addition

to describing numerous new genera and species from Europe, Kieffer (111) also published in 1913 his well-known monograph of Cecidomyidae in the *Genera Insectorum* series. The gall midges of America have been made known chiefly through the descriptions of Felt. His studies have also enriched our knowledge of the morphology and biology, while his *Key to Gall midges* (76) published in 1925, has placed the taxonomy of this group on a sound basis.

Occasional descriptions of gall midges of India were published from time to time in periodicals, several of which are not easily accessible. Brunetti (12) published a list of all Indian gall midges known up to 1920, and later Senior-White (167) collected together all references to the gall midges described from this country. The first gall midge to be described from India, *Lasioptera bryoniae* Schin., was by Schiner (165), while the well-known silver-shoot gall midge of Paddy was recorded by Wood-Mason (187) a few years later under the name *Cecidomyia oryzae*[1]. Kieffer (103) described some Bengal species in 1905, and later a number of midges from other parts of India (105). He (109) has also described a few species from Ceylon. Ramachandra Rao made extensive collections of these insects and made valuable observations (140) on the food-habits of numerous grass-infesting midges. One Indian fossil gall midge, *Winnertzia burmitica* (Cockl.)[2], was described by Cockerell (13) from burmite deposits. Houard (85) and Van Leeuwen (177 and 178) also described some midge galls from India. Sundar Raman (168) published a summary of the available information on the midge galls described from India. Felt's recent contributions on the Indian species of this family are the most important, and in all about one hundred species distributed over forty eight genera have so far been recorded from India. The rich flora of India, however, supports a much larger number of gall midges.

I began my studies on this group in 1926 and made extensive collections in various parts of India, particularly in South India. A considerable portion of the material studied was bred from various plant galls, though many midges were captured while on flight. Through the courtesy of the various authorities concerned, I have been able to examine the collections in the Agricultural Research Institute, Coimbatore and the Central Agricultural College and Research Institute, Pusa. Numerous unidentified midges collected at various times by the late Dr. N. Annandale, Dr. Stanley Kemp and the other officers of the Zoological Survey of India, were also placed at my disposal through the kindness of Dr. Baini Prashad, Director, Zoological Survey of India. A number of midges were also received from various other sources by presentations and exchanges.

As a result of these studies I have come across several new genera and species and the following well-known genera not previously recorded from this country: *Catocha* Hal., *Microcerata* Felt, *Clinophena* Kieff., *Neolasioptera* Felt, *Prolasioptera* Kieff., *Stefaniola* Kieff, *Thurauia* Rubs., *Myricomyia* Kieff., *Microdiplosis* Tav., *Cecidomyiella* D. G. and *Xylodiplosis* Kieff. Two new genera and nineteen new species are described

[1] This midge was referred by Felt (72) to the genus *Pachydiplosis* Kieff., but has never been described. I have described it in detail in this paper p. 433.

[2] Originally described as *Winnertziola burmitica* Cockl. *vide infra* p. 384.

below. The arrangement of the sub-families, tribes and genera is based on the classification proposed by Felt (76). In the matter of nomenclature, the decisions of the International Commission have been strictly adhered to and Meigen's earlier name of 1800 is used. Notes on the habits and life-history of the midges are also given in a few cases. The galls made by the various new species of midges are also described in detail. The elaborate keys of Felt to the genera and species, revised wherever necessary to include the new forms which are given in this paper, will, it is hoped, be found useful by future workers on this difficult group. The types of the new genera and species described here are deposited in the collections of the Zoological Survey of India, Indian Museum, Calcutta.

I take this opportunity of recording my great indebtedness to the world-authority on this family, Dr. E. P. Felt, State Entomologist, New York, whose works have been indispensible throughout my studies. My grateful thanks are due to Dr. Baini Prashad, Director, and to Dr. Hem Singh Pruthi, formerly Assistant Superintendent, Zoological Survey of India, for giving me all facilities for work, for valuable suggestions and for constant encouragement and help. My sincere thanks are also due to Rao Bahadur Y. Ramachandra Rao, Locust Entomologist, Karachi, for guiding me in the early stages of my study. Last but not the least, my thanks are also due to Dr. Ronald Senior-White, Malariologist, Bengal Nagpur Railway, Calcutta, for helping me with important literature.

SYSTEMATIC.

The family Itonididae is divided into three sub-families, *viz.*, Lestremiinae, Heteropezinae and Itonididinae.[1] The sub-family Lestremiinae is the most generalised group of this family, being the connecting link between the families Itonididae and Mycetophilidae. In its general characters and habits, it is not far removed from the Mycetophilidae, but it is easily distinguished by the absence of apical tibial spurs and by the moderate development of the coxae. The members of this sub-family are mostly small or medium-sized, dark brown or black midges, and are characterised by the metatarsus being longer than the following segments, by the presence of the long forked or simple fourth vein and by the entire absence of circumfili. Most midges belonging to this group breed, like the Mycetophilidae, in dead or decaying vegetable matter. There are two tribes under this sub-family : Lestremiinariae and Campylomyzariae. The tribe Lestremiinariae, comprising eight genera, is characterised by a forked fourth vein. The other tribe Campylomyzariae is recognised by a simple fourth vein and includes twenty three genera ; it is more specialised than the Lestremiinariae.

[1] Some authors recognise a fourth sub-family, Termitomastinae. This sub-family is rather decadent and its exact relation to the other sub-families is not clearly understood. It includes the genus *Termitomastus* Silvestri, which consists of rather peuliar, nearly apterous midges, exclusively found as guests in the nests of termites. The sub-family differs from all others in the very much atrophied wings, two long and *two cross-veins* ; in the enormously swollen first five abdominal segments and in the small, slender posterior four abdominal segments. It is apparently confined to the Neotropical Region of South America.

The sub-family Heteropezinae is a connecting link between the two other sub-families, and according to Felt, is one of the oldest and most decadent group of midges. In general, it resembles Lestremiinae but is readily distinguished by the metatarsus being longer or shorter than the following segments, by the wings having not more than three long veins and by the absence of a cross-vein connecting the third vein with the sub-costa. There are about seventeen genera in this group. No form of this sub-family has yet been found in India.

The remaining sub-family Itonididinae is much larger than either of the preceding two and includes a great number of midges. The members of this sub-family are recognised by the metatarsus being always shorter than the following segment and by the presence of circumfili. It is divided into six tribes: Porricondylariae, Lasiopterariae, Dasyneurariae, Oligotrophiariae, Asphondylariae and Itonididinariae.

The tribe Porricondylariae is related to the tribe Lestremiinariae of the sub-family Lestremiinae, but is easily recognised by a distinct cross-vein connecting the third vein with the sub-costa. It comprises thirty genera, of which eight have been found in India. Most of the species breed in decaying vegetable matter, although many attack living plants and produce galls on them.

The tribe Lasiopterariae includes a large number of well-marked gall-forming midges, distributed over eighteen genera, three of which occur in India. The members of this tribe are recognised by the great reduction of the costa and the more or less close approximation of the costa, the sub-costa and the third vein. These three veins are also thickly scaled. The abdomen is often thickly covered with black and silvery-white or yellowish scales. The antennae are short and have numerous short, sessile, cylindrical segments.

The next tribe, Dasyneurariae, comprises over forty-two genera, distributed all over the principal continents. Four genera have been found in India. The midges of this tribe are separated from all others by their denticulate claws, by the third vein being well separated from the costa and by the antennal segments being produced and often stemmed. They breed in wrinkled leaves, buds, and leaf galls.

The Oligotrophiariae are distinguished from the foregoing tribe by their simple claws. They include twenty-eight genera, of which only two have been found so far in this country. The genera of this tribe were originally included by Kieffer and Rubsaamen in the Dasyneurariae but Felt has rightly separated them.

The tribe Asphondylariae is widely distributed and comprises large-sized midges, distributed over twenty-seven genera, three being known from India. The midges of this tribe are recognised by the sessile, elongate, cylindrical antennal segments, simple claws and the usually aciculate ovipositor. They are all gall-forming in habit and mostly attack leaves and flowers but sometimes fruits as well.

The remaining tribe Itonididinariae is the most specialised group and is the richest in genera and species. It includes more than half the known genera and about one-third of the known species. It is subdivided into two sub-tribes: Bifila and Trifila. Thirty-two Indian genera fall under this group. The species belonging to it are characterised

by the greatly produced binodose male antennal segments, and the circumfila formed into bow-like loops. The sub-tribe Bifila has the nodes of the male antennal segments equal and with only two whorls of circumfila on the enlargements. The sub-tribe Trifila differs in having the nodes distinctly unequal and with three whorls of circumfila. Most midges included in this tribe are gall-forming, while many are mycophagous or zoophagous. A key to the sub-families and tribes from Felt is given below, while for the genera reference may be made to Felt (76).

Key to sub-families and tribes.

I. Metatarsus longer than the following segment, tarsal segments five; wings with four long veins, cross-vein usually present — Lestremiinae.

A. Fourth vein forked — Lestremiinariae.

B. Fourth vein simple, not forked — Campylomyzariae.

II. Metatarsus longer or shorter than the following segment; wings with not more than three long veins, cross-vein absent; circumfila wanting — Heteropezinae.

III. Metatarsus always shorter than the following segment; wings with three or four long veins; circumfila present — Itonididinae.

A. Wings with a distinct cross-vein connecting third vein and sub-costa and usually parallel with costa — Porricondylariae.

B. Wings without a distinct cross-vein.[1]

1. Costa thickly scaled, third vein usually very close to the anterior margin of the wing; antennal segments cylindrical, sessile and not produced — Lasiopterariae.

2. Costa rarely thickly scaled, third vein well separated from costa; antennal segments produced

a. Flagellate antennal segments cylindrical, never binodose in the male.

i. Claws toothed — Dasyneurariae.

ii. Claws simple.

A. Flagellate antennal segments cylindrical, not greatly elongated, usually stemmed in the male; ovipositor not aciculate — Oligotrophiariae.

B. Flagellate antennal segments cylindrical, elongated, sessile; ovipositor usually aciculate — Asphondylariae.

b. Flagellate antennal segments of male greatly produced, binodose; circumfila usually formed into bow-like loops — Itonididinariae.

i. Nodes of the male flagellate antennal segments equal, circumfila two — Bifila.

ii. Nodes of the male flagellate antennal segments distinctly unequal, circumfila three — Trifila.

[1] Except in some genera of the Itonididinariae, the cross-vein is generally absent. These genera are included by Felt (76) both under Porricondylariae and Itonididinariae, in the latter tribe on account of the antennal structure. I am, however, inclined to bring together under the Porricondylariae all genera with a cross-vein, which I believe is of greater phylogenetic importance than the antennal structure. Felt's table of Itonididinariae needs revision.

Sub-family LESTREMIINAE.

Tribe Lestremiinariae.

Genus **Catocha** Hal.

1833. *Catocha*, Haliday, *Entomol. Mag. London*, I, p. 156.
1846. *Macrostyla*, Winnertz, *Stett. Entomol. Zeit.*, VII, p. 20.
1846. *Furcinerva*, Rondani, *Nuov. Ann. Sc. Nat. Bologna*, (2) V, p. 7.
1862. *Catocha*, Osten Sacken, *Mon. N. Amer. Dipt.*, I, p. 177.
1864. *Catocha*, Schiner, *Fauna Austriaca, Dipt.*, II, p. 412.
1895. *Catocha*, Kieffer, *Bull. Soc. Entomol. France*, p. 319.
1900. *Furcinerva*, Kieffer, *Ann. Soc. Entomol. France*, LXIX, pp. 438-443.
1908. *Catocha*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 308.
1913. *Catocha*, Felt, *Bull. N. Y. St. Mus.*, No. 165, pp. 129-131.
1913. *Catocha*, Kieffer, *Gen. Ins.*, fas. 152, p. 306.
1925. *Catocha*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 136.

This genus, with about a dozen species mostly from America, has not so far been recorded from India. Some species occur on mosses; but no information is available about their habits and life-history.

The species of this genus are readily distinguished by the antennae having 11-16 segments, with the second segment not greatly enlarged and sometimes with several whorls of hairs on the segments. The palpi are quadriarticulate. Costa extends beyond the apex of the wing where it is joined by third vein.

Genotype.—Catocha latipes Hal.

Key to species, revised from Felt.

I. Flagellate antennal segments uninodose.	
A. Pulvilli rudimentary.	
1. Second, third and fourth palpal segments sub-equal . . .	*C. barberi* Felt.
2. Second, third and fourth palpal segments unequal .	*C. indica*, sp. nov.
B. Pulvilli well-developed	*C. slossonae* Felt.
II. Flagellate antennal segments binodose	*C. americana* Felt.

Catocha indica, sp. nov.

This new species appears to be closely allied to the American *Catocha barberi* Felt, but differs in the distal three palpal segments being of unequal length.

Female.— 3 mm. long. Antennae about one-fourth the length of the body, thickly haired, dark brown, segments 16; flagellate segments uninodose, fifth antennal segment of a length about twice its diameter, ninth and tenth segments barrel-shaped, eleventh segment with a stem one-fourth the length of the cylindrical basal enlargement, terminal segment fusiform, stout, of a length a little over twice its diameter. First palpal segment short, stout; second segment one and a half times stouter than the third, the latter a little more than twice its diameter. Mesonotum black. Scutellum and post-scutellum black. Abdomen dark brown. Basal plate of lamellae of ovipositor sub-quadrate, with a length nearly equal to its width; terminal plate elliptic, a little over half the breadth of the basal plate and a little over twice as long as broad. Metatarsus nearly as long as all the succeeding segments.

Co-types.—Females on slide Nos. $\frac{972}{H\ 6}$ and $\frac{973}{H\ 6}$.

Type-locality.—Lutkoh Valley, Chitral, N.-W. F. Provinces. Coll. Dr. B. N. Chopra, at light.

Genus **Lestremia** Macq.

1826. *Lestremia*, Macquart, *Rec. Soc. Sc. Ag. Lille*, p. 173.
1826. *Lestremia*, Meigen, *Syst. Beschr.*, V, p. 308.
1840. *Mimosciara*, Rondani, *Mem. Ia. Ital. Sc. Nat. Milano*, (4) II, p. 287.
1844. *Cecidogona*, Herman Loew, *Stett. Entomol. Zeit.*, V, p. 324.
1846. *Mimosciara*, Rondani, *Nuov. Ann. Soc. Nat. Bologna*, (2) VI, p. 10.
1846. *Furcinerva*, Rondani, *Nuov. Ann. Soc. Nat. Bologna*, (2) VI, p. 369.
1856. *Yposatea*, Rondani, *Dipt. Ital. Prodr.*, I, p. 198.
1860. *Molobroea*, Rondani, *Atti Soc. Sc. Nat. Lest. Milano*, II, p. 287.
1862. *Lestremia*, Osten Sacken, *Mon. N. Amer. Dipt.*, I, p. 178.
1864. *Lestremia*, Schiner, *Fauna Austriaca, Dipt.*, II, p. 413.
1870. *Lestremia*, Winnertz, *Verh. zool-bot. Ges. Wien.*, XX, p. 30.
1897. *Lestremia*, Kieffer, *Syn. Cecid. Europ. Alg.*, p. 52.
1900. *Mimosciara*, Kieffer, *Ann. Soc. Entomol. France*, LXIX, p. 437.
1900. *Cecidogona*, Kieffer, *Ann. Soc. Entomol. France*, LXIX, p. 443.
1900. *Furcinerva*, Kieffer, *Ann. Soc. Entomol. France*, LXIX, p. 443.
1908. *Lestremia*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 31.
1913. *Lestremia*, Felt, *Bull. N. Y. St. Mus.*, No. 165, p. 133.
1913. *Lestremia*, Kieffer, *Gen. Ins.*, fas. 152, p. 307.
1920. *Lestremia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 17.
1925. *Lestremia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 136.
1928. *Lestremia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 19.

This is the most generalised genus of the family. It has a world-wide distribution. About thirty species, most of them from America, have been recorded so far. Some European forms have been bred from decaying wood, but no information is available regarding the habits and life-history of the others. Two Indian species were described by Kieffer.

This genus is closely related to the genus *Catocha* Hal., but differs in the costa not extending beyond the apex of the wing. It is readily recognised by the following characters: Palpi quadriarticulate. Antennal segments 11-16, the second segment not greatly enlarged, third and fourth segments not fused, short, sub-cylindrical or sub-conical in the female; the male antennal segments with a distinct stem, the basal enlargements with crenulate whorls and long curved setae. Costa does not extend beyond the apex of wing before which it is joined by third vein. Fourth vein is forked.

Genotype.—*Lestremia cineria* Macq.

Key to species.

I. Terminal plate of lamellae of ovipositor lengthened, twice as long as broad; body yellowish in colour	*L. indica* Kieff.
II. Terminal plate of lamellae of ovipositor short, sub-orbicular; body reddish in colour	*L. ceylanica* Kieff.

Lestremia indica Kieff.

1909. *Lestremia indica*, Kieffer, *Rec. Ind. Mus.*, III, p. 29, fig. 1.
1913. *Lestremia indica*, Kieffer, *Gen. Ins.*, fas., 152, p. 308.
1920. *Lestremia indica*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 18.
1928. *Lestremia indica*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 19.

This species was described from midges collected by Dr. Annandale in Calcutta. The wing is figured by Kieffer. The type is in the Indian

Museum. Gravely observed it at Kurseong, Eastern Himalayas. One female was captured at light in Howrah. It appears to breed in decaying leaves. The adults avoid strong day light and hide in crevices in the bark of shady trees.

Lestremia ceylanica Kieff.

1912. *Lestremia ceylanica*, Kieffer, *Spol. Zeyl.*, VIII, p. 29.
1920. *Lestremia ceylanica*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 18.
1928. *Lestremia ceylanica*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 19.

This species was described from a female taken at light in Peradeniya, Ceylon. The type is lost due to bad preservation. One female was collected at light in a railway train at Trichinopoly, South India, which I readily identified as this species. Apparently it is distributed throughout South India. The species is not recorded by Kieffer in *Genera Insectorum*. The midges of this species are smaller than those of *L. indica* Kieff. and are of reddish colour.

Genus **Neolestremia,** nov.

This new genus is erected for midges bred from the leaf bud galls of *Boerhaavia* spp. It approaches *Lestremia* Macq. very closely, but is chiefly distinguished from it by its triarticulate palpi.

The following additional characters should prove useful for the identification of the genus. Antennae with 16 segments in the female, the first two flagellate segments not fused, second segment not greatly enlarged, all segments sub-cylindrical, uniformly covered with short setae and with stems never produced. Costa not reaching the apex of the wing but nearly disappearing at its union with third vein as in the genus *Lestremia* Macq., which it resembles in all other characters. The midges are also relatively larger.

Genotype.—Neolestremia boerhaaviae, sp. nov.

To indicate the exact relationships of the new genus *Neolestremia* with the allied genera I give below a revised version of Felt's Key (76), to the genera in which the antennae are moderately developed, having at least 11-16 segments, and with the second segment not greatly enlarged.

A. Palpi quadriarticulate.	
1. Costa extending beyond apex of wing	*Catocha* Hal.
2. Costa not reaching apex of wing but nearly disappearing at its union with third vein	*Lestremia* Macq.
B. Palpi triarticulate.	
Costa not reaching apex of wing but nearly disappearing at its union with third vein	*Neolestremia*, gen. nov.

Neolestremia boerhaaviae, sp. nov.

Female.— 3·5 mm. long. Body brownish in colour. Antennae one-third the length of body ; segments 16 ; stems of flagellate segments grow longer towards the distal part of antennae, first antennal segment irregular, second segment globose, both with lengths a little greater than their diameters, third segment with a length over twice its daimeter, with a stem roughly one-sixth the length of the enlargement, fifth segment with a length about twice its diameter and with a stem one-fourteenth the length of enlargement, twelfth segment with a length

twice its diameter and with a stem one-sixth the length of enlargement, terminal segment longer than all the preceding, somewhat reduced towards the apex and with a length about four times its basal diameter. Palpi first segment sub-globose, stout; second segment roughly obovate-elliptic, with a length about twice its diameter and a little over four times the first segment and somewhat more slender; third segment more slender than the second, sub-cylindrical, basally narrowed somewhat, with a length a little over four times its diameter. Metatarsus of fore-legs as long as all the next three other segments, metatarsus of mid-legs longer than the next three segments and the metatarsus of hind-legs longer than all the other segments and also nearly two-thirds longer than the metatarsi of the mid and fore-legs. Claws simple. Pulvilli short but longer than half the length of claws in the fore-legs and much shorter than half its length in the other legs. Basal segment of lamellae of ovipositor roughly quadrilateral, with somewhat rounded sides, and a little longer than twice its breadth. Terminal segment as long as the basal segment, linear-elliptic and one-third narrower than the basal segment.

Holotype.—Male, on slide No. $\frac{975}{H\,6}$.

Type-locality.—Madras Medical College Grounds, Madras Presidency, South India. Coll. M. S. Mani, 11.xi.1929.

Habitat.—Leaf bud galls of *Boerhaavia* spp. (Nyctagenae).

Life-history.—The eggs are laid on the tender buds and minute, colourless, apodous maggots hatch from them on the second day. The larvae attack the buds, the further development of which is thus interfered and instead of normally opening turn into a gall[1]. They feed on the viscid juice exuding from the glandular hairs and develop for nine days, at the end of which they are 3 mm. long and yellowish in colour. They then migrate from the galls and wander on the surface of the plant for a time and drop to the soil where they pupate. Pupal period occupies four days, at the end of which the adults fly out. There are several generations in one year. They also seem to hibernate in the soil during the hot summer months.

Genus **Microcerata** Felt.

1908. *Microcerata*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 309.
1911. *Microcerata*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 32.
1913. *Microcerata*, Kieffer, *Gen. Ins.*, fas. 152, p. 309.
1925. *Microcerata*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 136.

This genus has not been previously recorded from India. It is characterised by the great reduction of the antennae, which have only 8-10 or 11 segments. The species of this genus are believed to breed in decaying vegetable matter.

The genus may be recognised by the following characters: Palpi tri- or quadriarticulate; second antennal segment sub-globose and greatly enlarged; flagellate segments gradually grow shorter towards

[1] I am not quite sure whether this midge really causes gall-formation in this case as it is apparently the first record of such a habit. It appears probable that some other agency, possibly another midge, is the true gall-maker and *Neolestremia boerhaaviae*, sp. nov. may be an inquiline. I record here only the life-history, and the exact rôle of the species remains to be determined by future observations.

the distal part of the antennae; sub-costa and third vein united as though by a very short cross-vein, the fork of the fourth vein even; claws simple or denticulate.

Genotype.—Microcerata perplexa Felt.

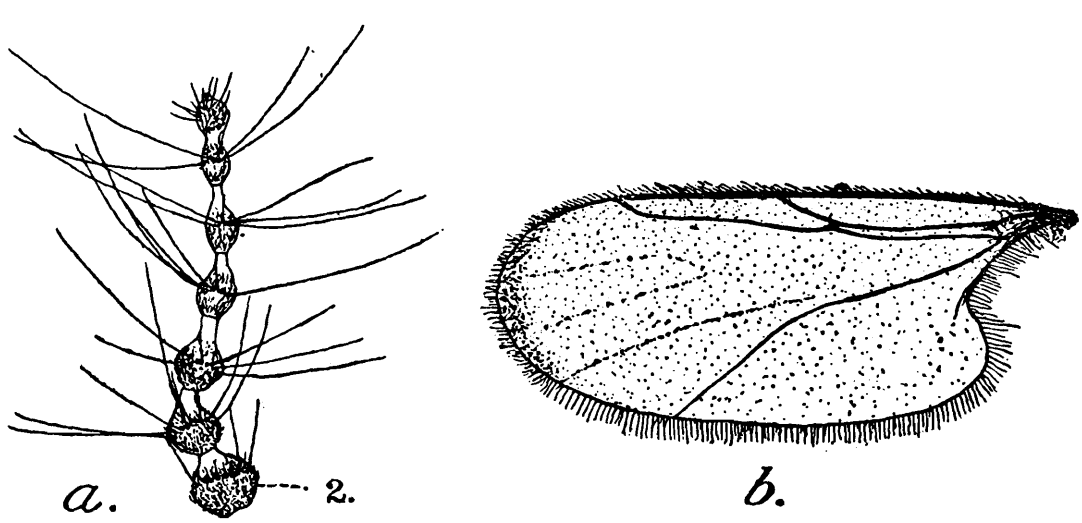
Key to species, revised after Felt..

I. Antennal segments 8.	
A. Claws simple	*M. cockerelli* Felt.
B. Claws denticulate.	
1. Palpi triarticulate	*M. indica*, sp. nov.
2. Palpi quadriarticulate .	*M. johnsoni* Felt.
II. Antennal segments 9.	
A. Palpi triarticulate .	*M. diervilli* Felt.
B. Palpi quadriarticulate.	
1. First three palpal segments sub-equal, fourth segment twice the length of the third	*M. corni* Felt.
2. First two palpal segments sub-equal, third segment one half longer, fourth segment twice the length of third	*M. spinosa* Felt.
III. Antennal segments 10.	
A. Pulvilli shorter than claws .	*M. perplexa* Felt.
B. Pulvilli as long as claws	*M. borealis* Felt.
IV. Antennal segments 11	*M. texana* Felt.

Microcerata indica, sp. nov.

(Text-figs. 1 & 2.)

Male.— 1 mm. long. Body reddish-brown in colour. Antennal segments 8, first two segments reddish-brown, flagellate segments fuscous,



TEXT-FIG 1.—*Microcerata indica*, sp. nov. *a*. antennae of male showing the segments becoming gradually smaller and shorter (Highly magnified); *b*. wing showing the third vein united with sub-costa as though by a very short cross-vein.

second antennal segment with a stem one-sixth the length of the basal enlargement, fourth segment with a stem one half the length of the basal

enlargement, terminal segment somewhat stouter than the one immediately preceding. Palpi triarticulate, first segment stout and expanded apically, second and third segments sub-equal and nearly half the length of the first. Mesonotum brownish-black. Wings coloured brown towards the apex. Claws tridentate. Empodium one half the length of claws.

TEXT-FIG 2.—*Microcerata indica*, sp. nov. Fifth tarsal segment with denticulate claws and empodium. (Highly magnified.)

Co-types.—Males, partly dissected on two slides. Nos. $\frac{976}{H\,6}$ and $\frac{977}{H\,6}$.

Paratypes.—Dry on pins. No. $\frac{978}{H\,6}$.

Type-locality.—Medha, Yenna Valley, Satara District, Bombay Presidency, 2000 ft. Coll. F. H. Gravely, 17-23. iv.1912.

Tribe CAMPYLOMYZARIAE.

Genus **Peromyia** Kieff.

1894. *Peromyia*, Kieffer, *Bull. Soc. Entomol. France*, p. 63.
1911. *Peromyia*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 32.
1912. *Peromyia*, Felt, *Bull. N. Y. St. Mus.*, No. 165, p. 160.
1913. *Peromyia*, Kieffer, *Gen. Ins.*, fas. 152, p. 292.
1920. *Peromyia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 17.
1925. *Peromyia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 137.
1928. *Peromyia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 19.

This genus appears to be identical with *Neurolyga* Rond. It seems to be insufficiently defined and appears in two places in Felt's (76) key to genera: between *Projoanissia* Kieff. and *Trichopteromyia* Will., and again between *Tetraxyphus* Kieff. and *Micromyia* Kieff. Two species, including one from India, have been described so far.

The following diagnosis of Felt will help in the identification of this genus: Palpi biarticulate; antennal segments 13 in female and 14, sub-globose and long-stemmed in male; third vein curves distally and joins the margin of the wing near the rudimentary fourth vein; claws sharply bent at right angles and swollen at the apical third; pulvilli long; basal clasp segment stout and truncate; terminal clasp segment short, stout, curved apically, greatly swollen and obtusely rounded distally; ovipositor quadriarticulate.

Genotype.—*Peromyia leveillei* Kieff.

Peromyia bengalensis Kieff.

1905. *Peromyia bengalensis*, Kieffer, *Ann. Soc. Sc. Bruxelles*, XXIX, p. 158.
1913. *Peromyia bengalensis*, Kieffer, *Gen. Ins.* fas. 152, p. 292.
1920. *Peromyia bengalensis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 17.
1928. *Peromyia bengalensis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 19.

This species was bred along with *Daphnephila lindrae* Kieff. (*vide infra* p. 415) from the galls of the latter, in which it appears to be an inquiline. The type could not be traced.

It may be recognised by the following characters: 1·5 mm. long.; reddish in colour; third antennal segment with a length twice its diameter; claws simple, twice as long as the empodium.

Sub-family ITONIDIDINAE.

Tribe PORRICONDYLARIAE.

Genus **Winnertzia** Rond.

1834. *Cecidomyia* (*partim*), Bouche, *Naturgesch. Insekten.*, I, p. 27.
1853. *Asynapta* (*partim*), Winnertz, *Linn. Entomol. Stett.*, VIII, p. 305.
1860. *Winnertzia*, Rondani, *Atti. Soc. Ital. Sc. Nat. Milano*, II, p. 287.
1864. *Clinorhiza*, Kieffer, *Ann. Soc. Entomol. France*, LXIII, p. 340.
1908. *Winnertzia*, Felt, *Bull. N. Y. St. Mus.*, No. 124, pp. 415, 421-422.
1913. *Winnertzia*, Kieffer, *Gen. Ins.*, fas. 152, p. 281.
1913. *Winnertziola*, Kieffer, *Marcellia*, II, p. 235.
1913. *Winnertziola*, Kieffer, *Gen. Ins.*, fas. 152, p. 283.
1915. *Winnertziola*, Felt, *Bull. N. Y. St. Mus.*, No. 180, p. 130.
1925. *Winnertzia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 139.

This genus, not previously recorded from this country, includes about thirty living and a few fossil species. It may be recognised by the cross-vein rising from third vein at an obtuse angle and by the horse-shoe shaped circumfila on opposite faces of the antennal enlargements. Fifth vein of wing is well developed.

Genotype.—Winnertzia lugubris Rond. (By original designation.)

Winnertzia burmitica (Cockerell).

1917. *Winnertziola burmitica*, Cockerell, *Psyche*, XXIV, p. 200, figs.

This fossil species was described by Cockerell from Burmese Amber, under the name *Winnertziola burmitica* Cockl. Felt (57) considers *Winnertziola* Kieff. to be identical with *Winnertzia* Rond. My own study of the diagnoses of the two genera has confirmed this view.

This species was found in clay of Miocene age, but Cockerell believes it to be older. The type location is not cited but it is presumably in the British Museum. Palpus, basal part of antenna, wing, part of haltere, claw and genitalia of this fossil are figured by Cockerell. Fletcher (80) has included this species in his account of Indian fossil insects and has reproduced the figures of Cockerell. Senior-White (167) has overlooked the genus in his Catalogue of Insects.

Genus **Colpodia** Winn.

1853. *Colpodia*, Winnertz, *Linn. Entomol. Stett.*, VIII, p. 188.
1908. *Colpodia*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 416.
1913. *Colpodia*, Kieffer, *Gen. Ins.*, fas. 152, p. 268.
1920. *Colpodia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 17.
1925. *Colpodia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 140.
1928. *Colpodia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 17.

This genus comprises about twenty species, mostly American. It is remarkable for its rather long wings and is easily recognised by the following characters: antennae with 12-16 segments; wings long and narrow, cross-vein at right angles to costa, fifth vein forked, sixth vein branches off from the fifth; claws usually simple; lamellae of ovipositor oval and feebly protractile; terminal clasp-segment short and swollen.

C. fletcheri Felt (59) was described from India. It falls between the American species *C. pratensis* Felt and *C. maculata* Felt in Felt's key (29) to species.

Genotype.—Colpodia angustipennis Winn. (By original designation).

Genus **Clinophena** Kieff.

1911. *Clinophena*, Kieffer, *Trans. Linn. Soc. London*, (2) Zool., XIV, p. 328.
1911. *Holoneurus* (partim), Kieffer, *Trans. Linn. Soc. London*, (2) Zool., XIV, p. 328.
1913. *Clinophena*, Kieffer, *Gen. Ins.*, fas. 152, p. 268.
1925. *Clinophena*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 140.

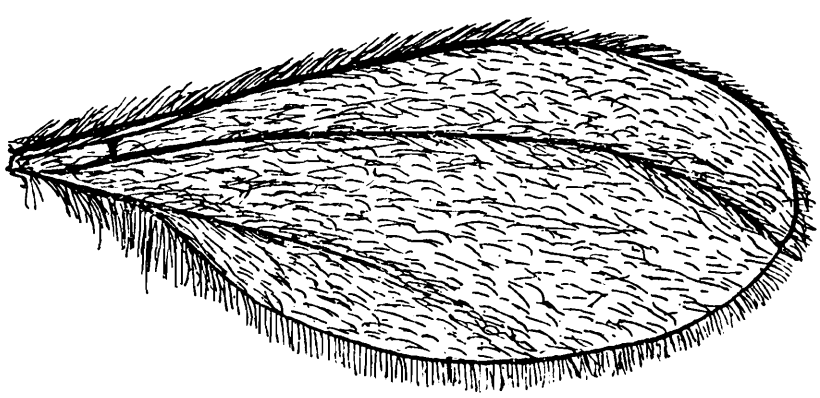
This small genus, with only one species, has not been previously recorded from India. It falls between *Colpodia* Winn. and *Paleocolpodia* Meun. in Felt's key (76) to genera. It resembles *Colpodia* Winn. in all characters except in the simple fifth vein not reaching the wing margin. It may be recognised by its long and narrow wings, with cross vein at right angles to costa and by its simple claws.

Genotype.—Clinophena mahensis Kieff.

Clinophena indica, sp. nov.

(Text-fig. 3.)

This new species is described from a male collected in the Eastern Himalayas.



TEXT-FIG 3.—*Clinophena indica*, sp. nov. Wing showing the fifth vein not reaching the posterior margin.

Male.— 1·5 mm. long. Antennae as long as body, segments 14; first six segments swollen somewhat basally and apically, rest of the

segments uniformly sub-cylindrical ; third segment with a stem one half the length of basal enlargement, which latter has a length about six times its middle diameter ; fifth segment with a stem two-thirds the length of the basal enlargement, which latter has the apical swelling a little stouter than the basal ; eighth and ninth segments sub-equal, with stems also sub-equal in length to the basal enlargements, which latter have lengths a little over one quarter their diameters ; terminal segment cylindrical, elongated, with a length about four times its diameter and with a constriction near its apex. Palpi first segment with a length twice its diameter ; second segment thrice the length of the first and somewhat more slender ; third segment one-third shorter than the second and stouter than all the other segments ; fourth sub-equal to third but somewhat more slender ; mouth parts somewhat prolonged. Claws simple, short, almost bent at right angles. Pulvilli a little over half the length of the claws.

Holotype.—Male, partly dissected on slide. No. $\frac{979}{H\ 6}$.

Type-locality.—Kurseong, Eastern Himalayas, 4700 ft. to 5000 ft. Coll. N. Annandale, 20.vi.1910.

Genus **Misocosmus** Kieff.

1912. *Epidosis (partim)*, Kieffer, *Spol. Zeyl.*, VII, p. 29.
1913. *Misocosmus*, Kieffer, *Bull. Soc. Nat. Hist. Metz.*, XXVIII, p. 55.
1913. *Misocosmus*, Kieffer, *Gen. Ins.*, fas. 152, p. 276.
1920. *Misocosmus*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 17.
1925. *Misocosmus*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 141.
1928. *Misocosmus*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 18.

This genus may be recognised by the following characters : palpi quadriarticulate ; antennal segments 13 ; flagellate segments of male elongated and distinctly stemmed, with circumfila not produced into long bow-like loops ; flagellate segments of female sessile ; wings with three long veins, crossvein parallel with costa, fifth vein forked ; claws simple, very small ; pulvilli rudimentary ; lobes of ovipositor very small.

Genotype.—Misocosmus ceylanicus (Kieff.).

Misocosmus ceylanicus (Kieff.).

1912. *Epidosis ceylanicus*, Kieffer, *Spol. Zeyl.*, VIII, p. 29.
1913. *Misocosmus ceylanicus*, Kieffer, *Gen. Ins.*, fas. 152, p. 276.
1920. *Misocosmus ceylanicus*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 17.
1928. *Misocosmus ceylanicus*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 18.

This species was originally referred to the genus *Epidosis* H. Loew and was described from midges collected at Peradeniya, Ceylon. It was later made the genotype of *Misocosmus* Kieff. Brunetti records that the type is in the Indian Museum, but only the labels are left and the insects are no longer available.

Genus **Dicroneurus** Kieff.

1894. *Epidosis (partim)*, Kieffer, *Ann. Soc. Entomol. France*, LXIV, p. 320.
1895. *Dicroneurus*, Kieffer, *Entomol. Nachr. Berlin*, XXI, p. 122.
1913. *Dicroneurus*, Kieffer, *Gen. Ins.*, fas. 152, p. 270.
1920. *Dicroneurus*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 16.
1925. *Dicroneurus*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 141.
1928. *Dicroneurus*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 18.

This genus is related to the preceding from which it may be distinguished by its denticulate claws. It may be recognised further by the capitate terminal clasp segment being as long as the basal clasp segment. The pulvilli are as long as the claws.

Genotype.—Epidosis lineatus (Kieff.) (Kieff.).

Dicroneurus indicus Kieff.

1913. *Epidosis indicus*, Kieffer, *Rec. Ind. Mus.*, IX, p. 200.
1913. *Dicroneurus indicus*, Kieffer, *Gen. Ins.*, fas. 152, p. 270.
1920. *Dicroneurus indicus*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 16.
1925. *Dicroneurus indicus*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 18.

This species was first described under the genus *Epidosis* H. Loew from males taken at Kalighat. It was transferred to *Dicroneurus* in the *Genera Insectorum*. The type is not in the Indian Museum.

Genus **Camptomyia** Kieff.

1894. *Camptomyia*, Kieffer, *Ann. Soc. Entomol. France*, LXIII, p. 323.
1913. *Camptomyia*, Kieffer, *Gen. Ins.*, fas. 152, p. 277.
1915. *Camptomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 180, p. 179.
1925. *Camptomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 142.
1928. *Camptomyia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 18.

This genus comprises about twenty species, mostly from Europe. The midges of this genus breed in decaying vegetable matter. No genotype appears to have been designated.

This genus falls between *Tetradiplosis* Kieff. & Jorg. and *Dirhiza* H. Loew in Felt's key (76) to genera. It is separated from either by its dorsally recurved abdomen. It may be recognised by the following additional characters: Palpi quadriarticulate; antennal segments 16-32; third and fourth segments fused; circumfila in male peculiar, one-looped and sinuous; stems of male antennal segments long but not as long as the segments; stems in female not longer than one half the length of the sub-cylindrical basal enlargement. Wings with three long veins, cross-vein parallel with costa, third vein forming an arch and joining costa at the apex of wing, fifth vein forked. Terminal clasp segment fairly long, sometimes slender or somewhat swollen. Dorsal plate bilobed. Ovipositor basal lamellae biarticulte, terminal lamellae simple.

Key to species.

I. Antennal segments of female 21	*C. ricini* Felt.
II. Antennal segments of female 24.	
A. Fifth antennal segment with a length two and half times its diameter, third palpal segment with a length five times its diameter	*C. morindae* Felt.
B. Fifth antennal segment with a length one-fourth its diameter, third palpal segment with a length about five times its diameter	*C. hibisci* Felt.

Camptomyia ricini Felt.

1921. *Camptomyia ricini*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 23.
1928. *Camptomyia ricini*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 18.

This species was described from midges bred from dried shoots of *Ricinus communis* Linn. at Coimbatore, South India. According to Felt

this species is typical of the genus. The type is in the New York State Museum.

I refer to this species a number of midges bred from dry, decaying fruit capsules of *Ricinus communis* Linn. at Tanjore, South India. Male 1 mm. long. Antennae one half longer than body and sparsely haired. Mesonotum reddish-brown. Scutellum and post-scutellum pale yellow. Abdomen yellow. Female about 2 mm. long. Antennae sparsely haired. Mesonotum brownish. Scutellum and post-scutellum yellow. Abdomen paler.

Camptomyia morindae Felt.

1926. *Camptomyia morindae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, IX, p. 241.
1928. *Camptomyia morindae*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 18.

This species was described from midges bred from larvae found attacking the trunk of *Morinda tinctoria* Roxb. at Coimbatore, South India. The type is in the New York State Museum. This species is represented in Ramachandra Rao collection at Coimbatore.

I refer to this species a series of midges taken on leaves of *Morinda tinctoria* Roxb. at Tanjore, South India. The midges have been observed flying at dusk. Male 1·75 mm. long. Antennae longer than body and thickly haired. Mesonotum dark brown. Scutellum yellow. Abdomen dark yellowish-brown and thickly haired. Female a little shorter than male. Antennae three-fourth the length of body and thickly haired. Mesonotum reddish-brown. Scutellum and post-scutellum dirty yellowish. Abdomen yellowish.

Camptomyia hibisci Felt.

1926. *Camptomyia hibisci*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, IX, p. 241.
1928. *Camptomyia hibisci*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 18.

This species was described from midges bred from rotting stems of *Hibiscus* sp. at Coimbatore, South India. The type is in the New York State Museum. I have not come across this species.

Genus **Lopesiella** Tav.

1908. *Lopesiella*, Tavares, *Broteria*, VII, p. 145.
1913. *Lopesiella*, Kieffer, *Gen. Ins.*, fas. 152, p. 252.
1925. *Lopesiella*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 142.
1928. *Lopesiella*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 16.

This small genus, with only two species, is remarkable for having the antennae resembling those of the genus *Asphondylia* H. Loew, especially in the tortuous circumfili. Kieffer (111) is of the opinion that this genus should be included in the tribe Asphondylariae. Its characters, however, are quite distinctly marked and I am inclined to agree with Felt and retain it in the Porricondylariae.

The species of this genus may be recognised by the following characters : Palpi triarticulate; antennal segments 14, sessile in both sexes, second segment flattend, third segment with a length about four times its diameter and not fused with fourth, terminal segment with a

prolongation, circumfila tortuous as in *Asphondylia* H. Loew; wings with three long veins, fifth vein forked; claws long, not strongly curved, simple; pulvilli rudimentary.

Genotype.—Lopesiella combreti Tav.

Lopesiella polliniae Felt.

1927. *Lopesiella polliniae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, X, pp. 2-3.
1928. *Lopesiella polliniae*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 16.

Midges bred by Ramachandra Rao from galls of *Pollinia argentea* at Thaliparamba, Malabar, South India, were provisionally referred to this genus by Felt. Males of this species have not been noted so far. It is represented in Ramachandra Rao collection at Coimbatore.

Genus **Pruthidiplosis,** nov.

This new genus, named after Dr. Hem Singh Pruthi, is erected for a rather unique midge, which gives rise to corticose galls on flowers of *Mimusops hexandra* Roxb. Its characters are very striking and do not admit of its being referred to any known genus. At first sight this genus may be taken for one of the Itonididinariae but the presence of the distinct cross-vein clearly indicates that it should be referred to this tribe.

It falls between *Allodiplosis* Kieff. and Jorg. and *Holoneurus* Kieff. in Felt's key (76) to genera. It resembles the former in its long-looped circumfila and forked fifth vein, but differs in its biarticulate palpi and simple claws. It resembles *Holoneurus* Kieff. in its obsolete sixth vein but differs in its forked fifth vein and simple claws. From the foregoing genus *Lopesiella* Tav. it may be distinguished by the biarticulate palpi, and long bow-loop circumfila.

The following are its diagnostic characters: Palpi biarticulate; antennal segments 14; flagellate segments of female cylindrical and moderately stemmed; flagellate segments of male binodose and long-stemmed; circumfila of male formed into moderately long, bow-like loops as in the tribe Itonididinariae and in two even whorls as in the genus *Contarinia* Rond. Wings with three long veins; third vein with a distinct cross-vein nearly parallel with costa and apparently a continuation of third vein; fifth vein forked, distally with the branches very faint; sixth vein obsolete. Terminal clasp segment moderately long. Ovipositor short and bilobed.

Genotype.— Pruthidiplosis mimusopsicola, sp. nov.

To indicate the position of *Pruthidiplosis* in the series of genera with the cross-vein parallel or nearly so to the costa I give below a key revised from Felt (76).

I. Wings with three long veins, fifth vein forked, sixth a branch of fifth or wanting.
  A. Circumfila not formed into long loops.
  B. Circumfila formed into long loops.
    1. Claws denticulate.
      a. Palpi quadriarticulate . *Lopesia* Rubs.
      b. Palpi uniarticulate *Allodiplosis* Kieff. & Jorg.
    2. Claws simple.
      Palpi biarticulate . . . *Pruthidiplosis*, gen. nov.

II. Wings with three long veins, fifth vein simple, sixth vein obsolete.

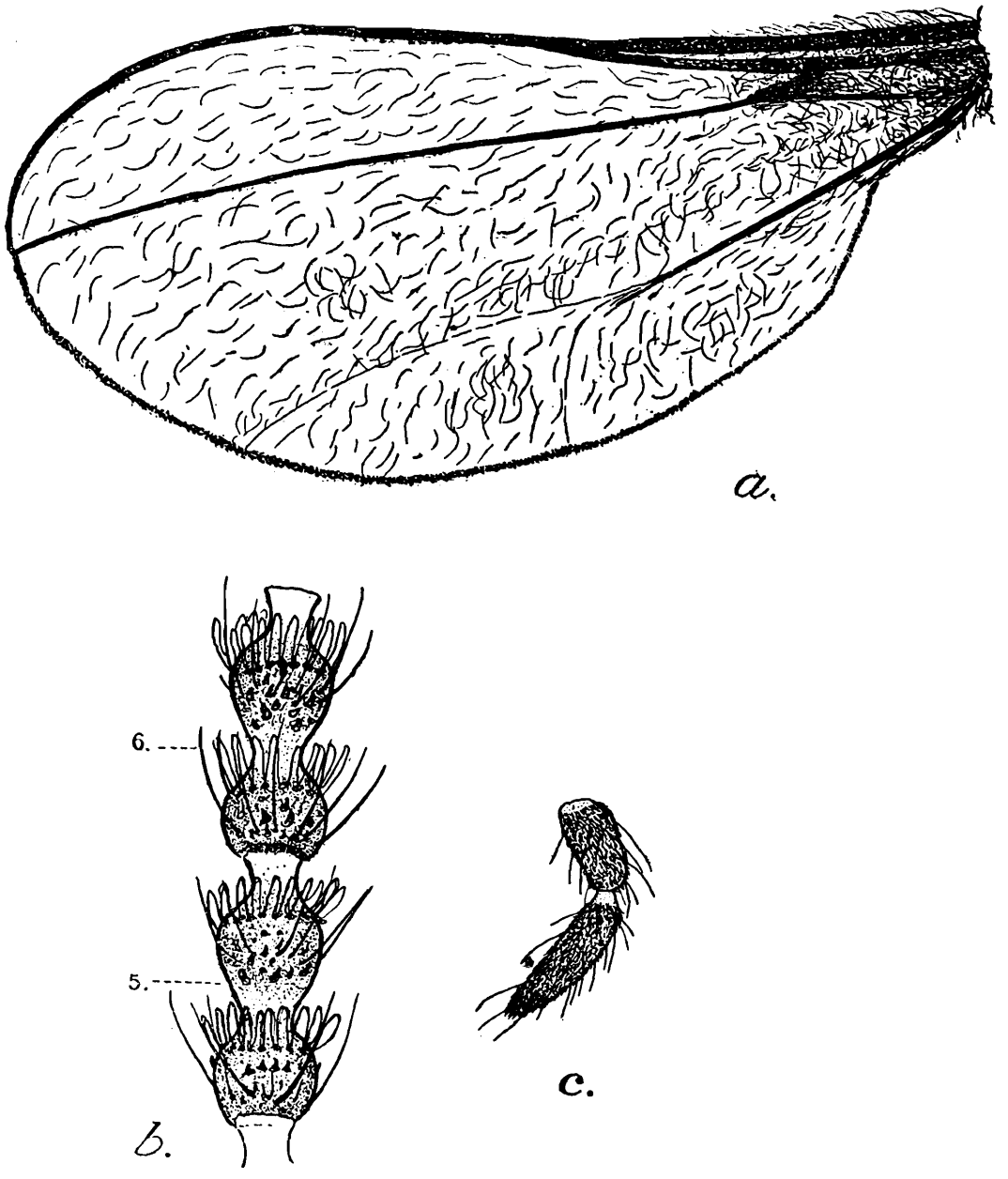
A Claws denticulate.

1. Claws as long or twice as long as pulvilli . *Holoneurus* Kieff.
2. Claws more than twice the length of pulvilli *Coccopsis* Meij.

Pruthidiplosis mimusopsicola, sp. nov.

(Text-figs. 4, 5 & 6.)

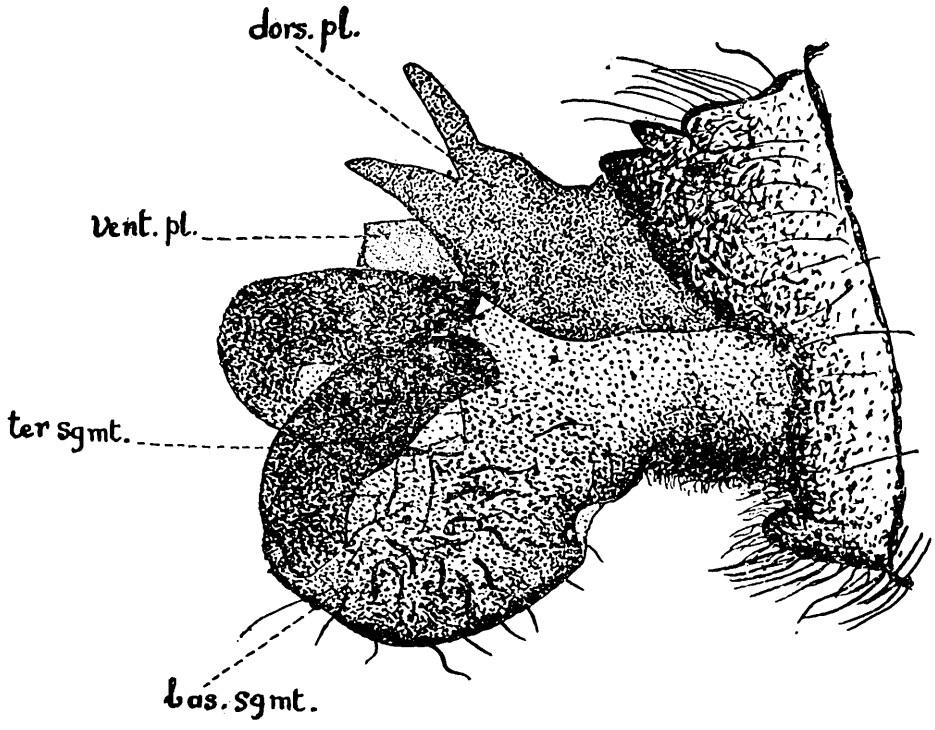
This midge attacks the flower buds of *Mimusops hexandra* Roxb., thus preventing the formation of normal fruits but producing fruit-like corticose galls, *i.e.*, galls with a spongy inner substance and a hard shell-like outer rind.



TEXT-FIG. 4.—*Pruthidiplosis mimusopsicola*, sp. nov. *a.* wing ; *b.* antennal segments of male ; *c.* palpus.

Male.— 3 mm. long. Body dirty-brown in colour. Antennae two-thirds the length of body ; segments 14 ; third segment with ovoid

enlargements ; fifth segment with stems about one-sixth and one-third the diameter of the basal and apical sub-globose enlargements respectively, circumfila loops of this segment as long as the stem on the basal enlargement and half the length of stem on the apical enlargement ; sixth segment with stems one-third and one-half the diameters of the basal and apical sub-globose enlargements respectively ; terminal segment with a stem one-sixth the length of segment and a little less than half the diameter of the enlargement, the obpyriform apical enlargement with a linear pyriform prolongation nearly equal to the diameter of the enlargement ; circumfila on all segments in two even whorls similar to those of the genus *Contarinia* Rond. but with the loops somewhat shorter. Palpi biarticulate ; first segment with a length one-fourth greater than its diameter ; second segment more slender, about twice the length of first and somewhat reduced towards its apex. Mesonotum brownish-black. Claws simple on all legs. Empodium a little longer than claws. Basal clasp segment of genitalia with numerous dark, stout, strongly chitinised, somewhat curved setae on both inner and outer surfaces. Terminal clasp segment with a length about five times its width, with the tip strongly chitinised and bluntly pointed.



TEXT-FIG. 5.—*Pruthidiplosis mimusopsicola*, sp. nov. Male genitalia ; *dors. pl.* dorsal plate ; *vent. pl.* ventral plate ; *ter. sgmt.* terminal clasp segment ; *bas. sgmt.* basal clasp segment.

Female.— 4 mm. long. Body bright reddish in colour. Antennae half the length of body ; segments 14, cylindrical ; third and fourth segments united, sub-equal, constricted in the middle, with stems roughly one-sixth the length of the enlargements ; fifth segment with a stem one-third the length of enlargement which latter has a length a little over twice its diameter ; sixth segment with a length one-fourth the length of the enlargement, which latter has a length twice its diameter ; twelfth segment with a stem a little less than one-fourth the length of

enlargement, which latter has a length less than twice its diameter; terminal segment one half longer than the one immediately preceding, with a constriction at its apical third; all segments with a thick basal whorl of setae as long as the enlargements and an apical whorl of setae a little shorter than the enlargements. First palpal segment with a length a little over twice its diameter and thickly setose; second segment a little over one half longer than the first, thickly setose and reduced towards the somewhat chitinised tip. Mesonotum dark brown. Scutellum black. Claws simple on all legs and a little longer than empodium. Ovipositor with the terminal lamellae rounded.

Pupae.—4·5 mm. long, stout, cylindrical and dark reddish in colour. Antennal horns (cephalic horns) serrated on the anterior side. The two small thoracic horns pointed backwards. Anal horns closely adpressed. Spiracles of third abdominal segment oval, somewhat larger than those of the others, which are circular. Pupation in galls.

Holo-co-types.—Male, on slide. No. $\frac{980}{H\,6}$ and in spirit No. $\frac{1029}{H\,6}$.

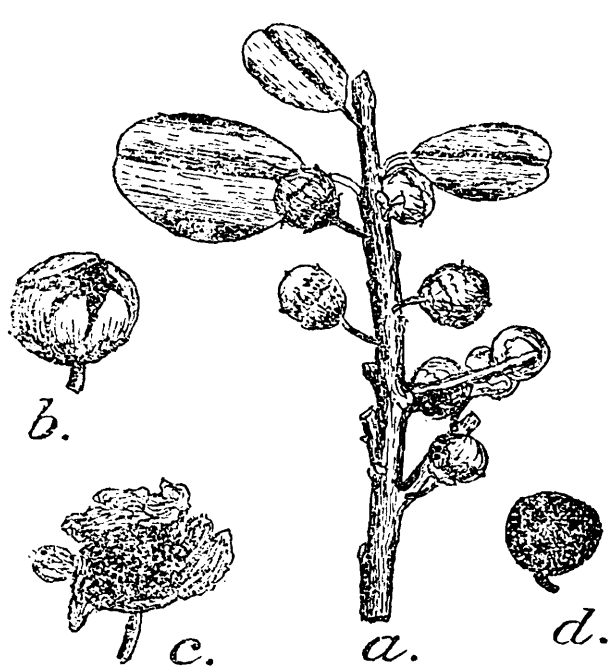
Allotype.—Female, in spirit. No. $\frac{981}{H\,6}$.

Para-co-types.—Two males on slide. No. $\frac{982}{H\,6}$.

Paratypes.—Males and females in spirit. No. $\frac{983}{H\,6}$.

Type-locality.—A scrub-jungle near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 18.xii.1932.

Galls.—These galls look very much fruits and as such indeed they have found their way to many herbaria. Their true nature cannot be detected except on minute examination.



Text-fig. 6.—*Pruthidiplosis mimusopsicola*, sp. nov. Galls on flowers of *Mimusops hexandra* Roxb. *a.* a twig with galls; *b.* a mature gall about to dehisce, showing cracks in the scleroderm; *c.* old gall showing the exuvia of the midges projecting from the spongy substance; *d.* gall cut into two to show the larval cavities.

10-15 mm. in diameter. Regular, globose, rarely barrel-shaped or obpyriform; dark green and glabrous; dehiscent, acystiferous, with a solid, white, spongy inner substance and a hard outer rind—the scleroderm. They are borne on curved pedicels and are crowded towards the

tip of the stout, cylindrical twigs. Ovoid larval chambers are found in the spongy substance just below the scleroderm.

Really these galls are the flowers, with all the floral envelopes involved. The calyx is often persistent, accrescent and cupiform at the base of the gall; ordinarily the sepals, petals, stamens and style are found as minute, spine-like vestiges on the surface of the galls. When the galls mature, the scleroderm dehisces, exposing the pupae sticking out from the inner substance and thus facilitating easy escape later on of the adult midges.

Tribe LASIOPTERARIAE.

Genus **Lasioptera** Meig.

1818. *Lasioptera*, Meigen, *Syst. Beschr. Europ. Zweifl. Insekt.*, I, p. 88.
1818. *Diomyza*, Meigen, *Syst. Beschr. Europ. Zweifl. Insekt.*, I, p. 89.
1853. *Lasioptera*, Winnertz, *Beitr. einer Mon. Gallmuck.*, p. 191.
1862. *Lasioptera*, Osten Sacken, *Mon. N. Amer. Dipt., Cecid.*, p. 175.
1908. *Lasioptera*, Felt, *Bull. N. Y. St. Mus.*, No. 124, pp. 323-327.
1913. *Lasioptera*, Kieffer, *Gen. Ins.*, fas. 152, p. 30.
1918. *Lasioptera*, Felt, *Bull. N. Y. St. Mus.*, No. 198, p. 107.
1920. *Lasioptera*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 8.
1925. *Lasioptera*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 142.
1928. *Lasioptera*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 1.

The genus *Lasioptera* Meig. comprises over one hundred and fifty species distributed all over the whole world. They are gall-making in their habits and attack both herbaceous and woody plants, among which grasses are often prominent. They generally produce galls on shoots, though sometimes galls are also produced on leaves. They have mostly been found in India on members of the natural order Cucurbitaceae. Some species may prove to be of economic importance in India.

The members of this genus are characterised by the presence of thickly scaled and closely approximated costa, sub-costa and third vein. They are characteristically coloured and the dorsum of their abdomen is often conspicuously ornamented by yellowish-white or silvery-white spots or markings. The ovipositor of some species has a number of stout, recurved chitinous hooks. They may be easily recognised by the following additional characters: Palpi quadriarticulate; antennal segments 16-33 in female and 16-22 in male, some species having equal number of segments in both sexes; third and fourth antennal segments fused or nearly so; wings with three long veins, third vein very near costa and uniting therewith at or before the basal half, very rarely beyond the basal third, fifth vein forked at some distance from its base; pulvilli well developed; ventral plate bilobed.

Genotype.—*Lasioptera albipennis* Meig.

Key to species.

I. Abdomen dark brown or black.
  A. Abdominal segments narrowly margined posteriorly with yellowish-white — *L. eriochloa* Felt.
  B. Abdomen dorsally with silvery-white sub-median spots.
    1. Antennal segments 18 in female — *L. fluitans* Felt.
    2. Antennal segments 20 (2+18) — *L. bryoniae* Schiner.
    3. Antennal segments 24 in female — *L. falcata* Felt.
II. Abdomen yellowish-brown — *L. paniculi* Felt.

Lasioptera eriochloa Felt.

1926. *Lasioptera eriochloa*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, IX, p. 244.
1928. *Lasioptera eriochloa*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 1.

Felt erected this species for midges bred by Ballard from ear-heads of *Eriochloa polystachya* at Coimbatore, South India. The type is in the New York State Museum. This species is represented in Ramachandra Rao collection by one female, 1·2 mm. long. Mesonotum dark reddish-brown, abdomen dark brown, segments narrowly margined posteriorly with yellowish-white.

Lasioptera fluitan Felt.

1917. *Lasioptera fluitans*, Felt, *Entomol. News*, XXVIII, p. 73.
1920. *Lasioptera fluitans*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 9.
1928. *Lasioptera fluitans*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 2.

This species was described from midges bred by Ramachandra Rao from galls of *Panicum fluitans* at Coimbatore. The type is in the New York State Museum. This species may be recognised by the following characters: Female 1·5 mm. long; antennal segments 18; mesonotum dark brown; scutellum dark reddish-brown; abdomen black, with lunate sub-median, silvery-white spots on segments 1-5.

Lasioptera bryoniae Schiner.

1868. *Lasioptera bryoniae*, Schiner, *Novara Reise Dipt.*, p. 5, pl. i, fig. 2, 3.
1913. *Lasioptera bryoniae*, Kieffer, *Gen. Ins.*, fas. 152, p. 31.
1920. *Lasioptera bryoniae*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 9.
1928. *Lasioptera bryoniae*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 1.

This species was bred out of shoot galls of *Bryonia* sp. from Vellore in Madras Presidency. The description of the species is unfortunately faulty and I have not seen any specimens.

Lasioptera falcata Felt.

1919. *Lasioptera falcata*, Felt, *Philipp. Journ. Sc.*, XIV, p. 288.
1919. *Lasioptera falcata*, Ramakrishna, *Rep. Proc. Third Entomol. Meet., Pusa*, I, p. 324, pl. xviii, fig. *a* & *b*.

This species was described from a single female bred from stem galls of an unnamed Cucurbit from the Philippines. Midges bred from the well-known vine galls of Bitter gourd, *Momordica charantia* Linn., are also referred by Felt to this species. It is remarkable that this species occurs in such widely separated areas. It is reported to be very common at Coimbatore. The adult midge and its galls are figured by Ramakrishna Ayyar. I have collected it in various localities in South India.

Lasioptera paniculi Felt.

1920. *Lasioptera paniculi*, Felt, *Philipp. Journ. Sc.*, XVII, p. 232.

This species was described from the Philippines from midges bred from panicles of *Panicum carinatum* Presl. It is found in Ramachandra Rao's collection at Coimbatore with the label: Bred from ear-heads of *Panicum prostratum* Lamk., Y. R. Rao, Coimbatore. These midges were

evidently identified by Felt and there seems to be no doubt as to the occurrence of this species in South India. Senior-White does not mention this species in his catalogue.

Lasioptera textor Kieff.

1905. *Lasioptera textor*, Kieffer, *Ann. Soc. Sc. Bruxelles*, XXIX, p. 155.
1920. *Lasioptera textor*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 9.
1928. *Lasioptera textor*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 2.

Kieffer erected this species for a midge bred from galls of *Polygonum molle*. The sex of the midge described and the type-location are not stated. The fact that the mouth parts are described as prominently prolonged casts doubt on the correctness of Kieffer's identification. It would appear to belong either to the genus *Clinorhyncha* H. Loew or *Ozirhinchus* Rond., but Kieffer's description is not detailed enough for deciding its exact position.

Lasioptera longispatha Kieff.

1908. *Lasioptera longispatha*, Kieffer, *Marcellia*, V, p. 157.
1920. *Lasioptera longispatha*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 9.

This species was erected by Kieffer from larvae taken from galls of *Camellia drupifera* at Kurseong, Eastern Himalayas. No adult is described. Larval characters, in the absence of a knowledge of their relationship to adult characters, are of doubtful value for taxonomic purposes.

Lasioptera trilobata Kieff.

1908. *Lasioptera trilobata*, Kieffer, *Marcellia*, V, p. 157.

This species was also described by Kieffer from larvae inhabiting the galls of *Schima walchii* at Kurseong. No adults are described.

Genus **Prolasioptera** Kieff.

1913. *Prolasioptera*, Kieffer, *Bull. Soc. Hist. Nat. Metz.*, No. 28, p. 27.
1913. *Prolasioptera*, Kieffer, *Gen. Ins.*, fas. 152, p. 33.
1925. *Prolasioptera*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 143.

This genus, not previously recorded from India, was erected by Kieffer for midges closely approaching *Lasioptera* Meig. but departing from it in its triarticulate palpi. It falls between *Lasioptera* Meig. and *Neolasioptera* Felt in Felt's key (76) to genera. It may be distinguished from the latter by its forked fifth vein. Altogether about half a dozen species, mostly from Europe, have been described so far. The midges of this genus pupate in their galls. One new species from the Madras Presidency is described below.

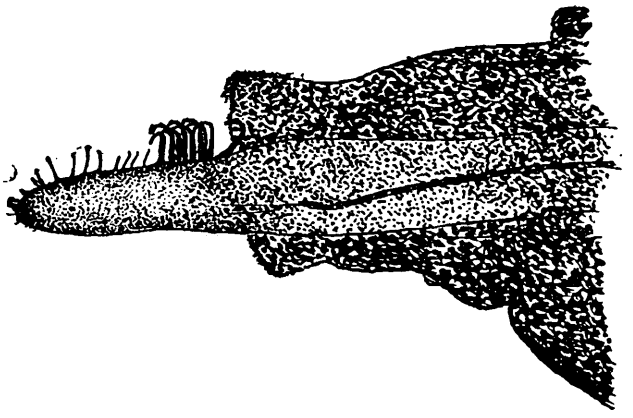
Genotype.—Prolasioptera nivocincta Kieff.

Prolasioptera annandalei, sp. nov.

(Text-fig. 7.)

Female.— 1 mm. long. Body yellowish-brown in colour. Antennae nearly half the length of body; segments 18; second segment subglobose; third segment somewhat stouter basally than apically, twice the length of second and more slender; fourth segment a little shorter,

somewhat more slender and more reduced towards the apex than third segment; fifth segment nearly uniform in thickness, sub-equal to fourth and one-fourth greater than its own diameter, very slightly constricted in the middle and with a very short stem; penultimate and terminal segments sub-equal, the former sub-pyriform, the latter pyriform, both with a length a little greater than their diameters. First palpal segment stouter apically than basally, with a length a little greater than its diameter; second segment one-half longer than first, slightly more slender, stout basally and slender apically and sparsely setose; third segment more slender and somewhat more thickly setose than second, twice as long, swollen and club-shaped beyond the basal half. Sub-median lines on the mesonotum scaled. Ovipositor with chitinous hooks from its one-fourth backwards.



TEXT-FIG. 7.—*Prolasioptera annandalei*, sp. nov. Ovipositor showing the dorsal row of chitinous hooks. (Highly magnified).

Holotype.—Female, on the same slide as the holotype of *Thurauia chilkaensis*, sp. nov. No. $\frac{984}{H\ 6}$.

Type-locality.—Barkuda Island, Chilka Lake, Madras Presidency, South India. Coll. N. Annandale.

Genus **Neolasioptera** Felt.

1908. *Neolasioptera*, Felt, *Bull. N. Y. St. Mus.*, No. 124, pp. 330-333.
1913. *Neolasioptera*, Kieffer, *Gen. Ins.*, fas. 152, pp. 22-23.
1918. *Neolasioptera*, Felt, *Bull. N. Y. St. Mus.*, No. 198, p. 171.
1925. *Neolasioptera*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 143.

This American genus, with about forty species, is recorded here for the first time from India. It is closely related to the two preceding genera, *Lasioptera* Meig. and *Prolasioptera* Kieff., both of which it resembles in general characters and habits. It may be distinguished from them by its simple fifth vein. Antennal segments vary from 17-29 in female and 12-23 in male.

The midges of this genus give rise to shoot galls, chiefly on herbaceous plants and occasionally also on woody plants and grasses. Two new species from South India are described below.

Key to species.

I. Abdomen black, palpi quadriarticulate, empodium as long as claws . . . . . *N. cephalandrae*, sp. nov.

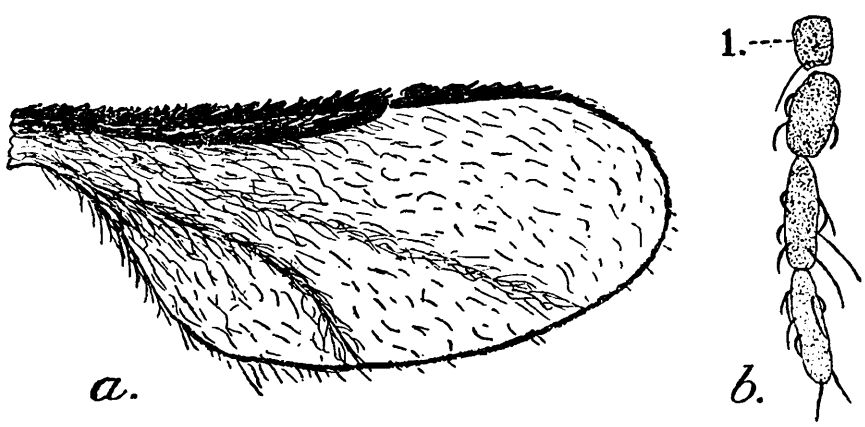
II. Abdomen brown, palpi triarticulate, empodium a little longer than claws in hind legs and as long as claws in other legs . . *N. crataevae*, sp. nov.

Neolasioptera cephalandrae, sp. nov.

(Text-figs. 8 and 9.)

This new species is described from midges bred from solid stem galls of *Cephalandra indica* Naud., which, though very common in India, does not appear to have been described so far.

Female.— 2 mm. long. Antennae less than one-fourth the length of body, segments 21 ; first segment obpyriform, with a length nearly equal to its diameter, second irregularly sub-globose, shorter and more slender than first, with a length a little less than its own diameter ;



TEXT-FIG. 8.—*Neolasioptera cephalandrae*, sp. nov. *a.* wing ; *b.* palpus.

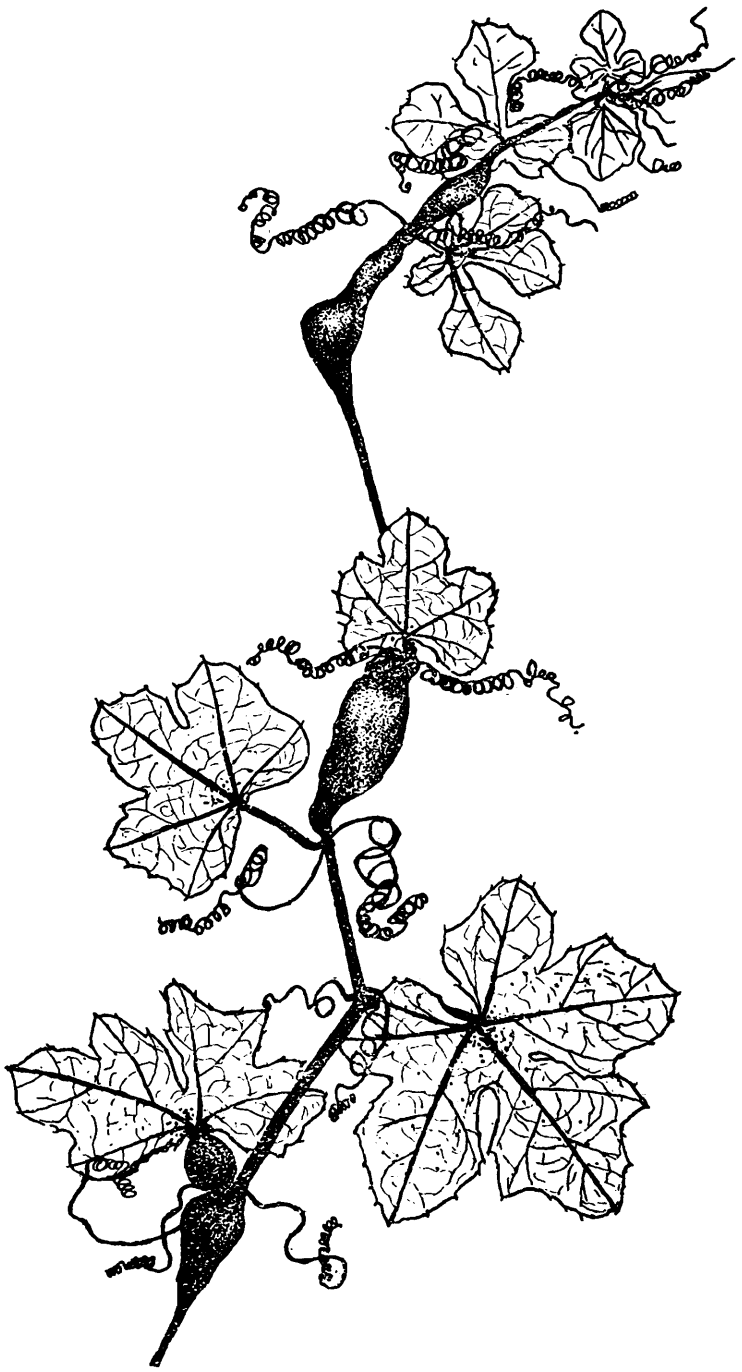
third segment obpyriform, with a length one-fourth shorter than its diameter ; fourth segment shortly sub-cylindrical, with a stem one-half the length of the basal enlargement ; fifth segment cylindrical, with a length less than half its diameter and with a very short stem ; terminal four segments somewhat stout basally ; penultimate segment distinctly broadened at base ; terminal segment of right antennae short, pyriform and with a length almost equal to its diameter ; terminal segment of the left antennae relatively twice longer, coniform and slightly constricted in the middle. Palpi quadriarticulate and sparsely setose ; first segment short, cylindrical ; second segment short, stout, oblong-ovoid and with a length about twice as long as its diameter ; third segment less than half the thickness of second and one-fourth longer ; fourth segment a little longer and somewhat more slender than third. Mesonotum brown. Halteres deep flesh-coloured. Tarsi unicolourous. Claws unidentate and as long as empodium. Abdomen covered dorsally with black scales not fully reaching the edges of the side on the posterior margins of segments. Ovipositor one-seventh the length of body, flesh-coloured, terminal portion with a length over twice its diameter, densely covered all round the apex with long stigmatic setae, whose tips are somewhat curved and hook-shaped and with over ten stouter, longer, chitinous hooks basally.

Holotype.—Female, partly dissected in spirit. No. $\frac{985}{H\,6}$.

Paratypes.—Four females, in spirit. No. $\frac{986}{H\,6}$.

Type-locality.—A scrub-jungle near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 15.vii.1933.

Other localities.—Coimbatore, Erode, Vellore, Madras and Calcutta.



TEXT-FIG. 9.—*Neolasioptera cephalandrae*, sp. nov. Shoot galls of *Cephalandra indica* Naud.

Galls.—25-40 mm. long and 15-30 mm. thick. Regular, ovoid, fusiform or moniliform, local or sub-extensive, solid, hard, fleshy, tuberous swellings of the vine. Yellowish-white or pale green, glabrous; cystiferous, indehiscent and with numerous minute circular holes on the surface when old.

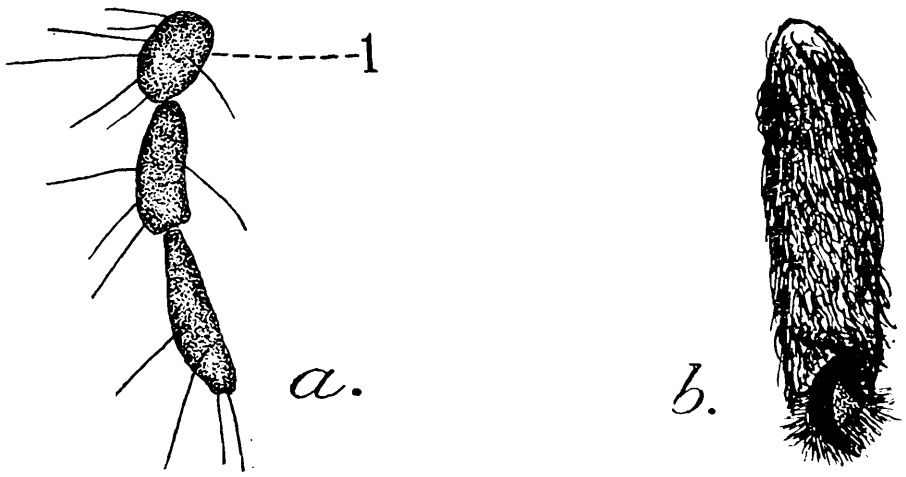
An extensive parenchyma surrounds the large, central, irregularly proliferating zone. Vascular bundles are scattered irregularly both in the parenchyma and the proliferating zone. Cysts are longitudinal and occur in the proliferating zone. The seat of cell proliferation appears to be the medulla of the stem.

Life-history.—Numerous eggs are laid close together on the young vines of *Cephalandra indica* Naud. The eggs hatch out on the fourth day and the maggots penetrate the stem and bore tunnels up and down in the medulla. The larvae continue to develop in the galls and reach maturity in four weeks. They then bore their way to the surface but do not make any hole. They pupate just beneath the epidermis in these cavities; this facilitates the easy escape of the adults, which emerge on the seventh day after the commencement of pupation. Just before the emergence of the adults, the pupae wriggle their way out, piercing the thin epidermis and project from the surface of the gall. The anterior end of the pupal case bursts and the adults escape leaving the exuvium sticking out from the holes. The larvae and pupae of the midges are very heavily parasitised by unknown Chalcid flies. There appear to be at least two generations in one year.

Neolasioptera crataevae, sp. nov.

(Text-figs. 10 and 11.)

This new species is erected for a midge, which attacks the young flower buds of *Crataeva religiosa* Forst. and gives rise to woody galls, not observed by previous workers.



TEXT-FIG. 10.—*Neolasioptera crataevae,* sp. nov. *a.* palpus; *b.* fifth tarsal segment showing unidentate claw and empodium.

Female.—2 mm. long. Antennae one-fourth the length of body, segments 21; first segment broadly obconic, with a length equal to its apical diameter; second segment globose; third segment subglobose; fifth segment shortly cylindrical, with a length a little greater than its diameter; penultimate segment with a length a little less than twice its diameter; terminal segments in both antennae short, pyriform and with lengths equal to their diameters. Palpi triarticulate and sparsely setose; first segment short, stout and ovoid; second segment with a length thrice its diameter and somewhat stout apically; third segment with a length roughly five times its diameter and a little longer than second, slender basally, rather stout in its apical half and truncate at the very tip. Mesonotum brown. Abdomen pale brown dorsally and yellowish-brown ventrally. Claws unidentate, a little

shorter than empodium and somewhat more sharply bent in hind than in other legs. Ovipositor with setae round apical half short and not stigmatic as in the foregoing species.

Holotype.—Female, in spirit. No. $\frac{987}{H\ 6}$.

Type-locality.—Grand Anicut Canal Bank, Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 19.vii.1933.

TEXT-FIG. 11.—*Neolasioptera crataevae*, sp. nov. Solid flower galls of *Crataeva religiosa* Forst.

Galls.—20-30 mm. in diameter. Regular, globose, generally flattened at the top, funnel-shaped at the base, solitary, clustered or sometimes compound, solid, hard, woody, indehiscent and cystiferous; yellowish-green or brownish-yellow, with reddish-brown spots; horizontal, thick, fleshy, flat out-growths basally, representing the sepals

and petals, and with more numerous short, conical or pyramidal, fleshy, recurved spinous eruptions above, representing the stamens.

Really the galls are the flowers with extensive cell proliferation involving the gynophore, calyx, corolla, stamens and sometimes the pistil also. The main seat of cell proliferation is the part of the flower stalk between the sepals and gynophore. The petals and sometimes the stamens revert to the primitive condition and tend to become small green leaves on the galls. The suppressed ovary and part of the gynophore immediately below it are sometimes found on the gall.

An irregular and broad ring of vascular bundles is embedded in a parenchyma of irregular cells.

Life-history.—The female midge lays eggs on the tender flower buds of *Crataeva religiosa* Forst. and the larvae hatching from them on the second day make their way into the vegetable tissues. As a result the flowers ail to open and in their places large, woody galls are formed. The larval period is presumably long, occupying well over two months. Pupation takes place in the galls and the pupal period is fifteen days. There appears to be only one generation in a year.

Genus **Stefaniola** Kieff.

1904. *Stefaniella (partim)*, Tavares, *Broteria*, III, p. 293.
1913. *Stefaniola*, Kieffer, *Bull. Soc. Hist. Nat. Metz.*, XXVIII, p. 45.
1913. *Stefaniola*, Kieffer, *Gen. Ins.*, fas. 152, p. 27.
1925. *Stefaniola*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 143.

This genus has not been previously recorded from India. It closely approaches *Stefaniella* Kieff. but is readily distinguished from it by its uniarticulate palpi and 11 antennal segments. According to Kieffer the first two flagellate antennal segments are fused together. Felt, however, places this genus in the series in which these segments are not fused. It falls between *Dibaldratia* Kieff. and *Salsolomyia* Tav. in Felt's key (76) to genera. As at present recognised, this genus is characterised by its obliquely truncate ovipositor dorsally having a row of hooks and by its small head well covered over by the mesonotum.

Genotype.—*Stefaniola salsolae* (Tav.).

Stefaniola bengalensis, sp. nov.

This new species is erected for a single female (?) in the collection of the Zoological Survey of India, Indian Museum. Except the antennae, part of wings and legs, the other parts are very badly damaged. The well-developed pulvilli and the 20 antennal segments are not strictly typical of the genus as defined by Kieffer. The uniarticulate palpi and the small head well under the mesonotum are strongly in favour of its being included in the genus as characterised by Felt. As it does not approach any other known genus so closely, I refer the midge, in spite of these variations, to this genus.

Antennal segments 20, moderately setose, third segment with a length a little greater than its diameter, fourth and fifth segments with lengths roughly equal to their diameters, terminal segment pyriform, with a length one-third greater than the basal diameter. Palpi uniarticulate, thickly scaled and with a length two and half .times its

diameter. Claws simple, strongly curved. Empodium well developed and longer than claws.

Holotype.—Partly dissected on slide. No. $\frac{988}{H\ 6}$.

Type-locality.—Port Canning, Bengal. Museum Coll. 6.xii.1907.

Tribe Dasyneurariae.

Genus **Hallomyia** Kieff.

1912. *Hallomyia*, Kieffer, *Spol. Zeyl.*, VIII, p. 25.
1913. *Hallomyia*, Kieffer, *Gen. Ins.*, fas. 152, p. 106.
1920. *Hallomyia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 11.
1925. *Hallomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 144.
1928. *Hallomyia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 6.

This genus, with only one species, appears to be closely related to *Stomatosema* Kieff. from which it is distinguished by its 13 antennal segments and spotted wings. Palpi are quadriarticulate. Empodium half the length of claws. Third vein is united with costa beyond the apex of wing.

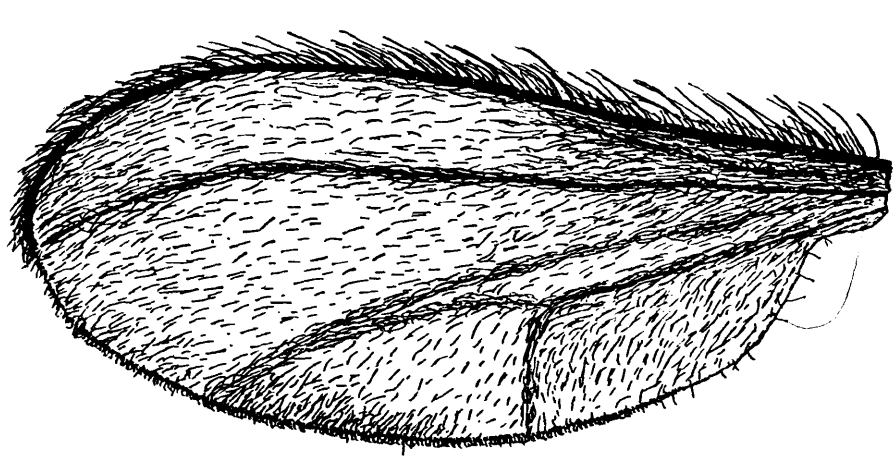
Genotype.—*Hallomyia iris* Kieff. (By original designation.)

Hallomyia iris Kieff.

(Text-fig. 12.)

1912. *Hallomyia iris*, Kieffer, *Spol. Zeyl.*, VIII, p. 25.

This species was described from Ceylon. The type-location is not stated. Brunetti records that three paratypes are in the Indian Museum. Except for one very badly damaged specimen, the other two have completely disappeared due to bad preservation. I have mounted (Slide No. $\frac{989}{H\ 6}$) this midge to prevent its further deterioration and figure its wing to show the third vein making an arch and uniting with costa



Text-fig. 12.—*Hallomyia iris* Kieff. Wing.

beyond the apex of wing. The round spots on the wings described by Kieffer are not visible in the specimen. The head, showing the somewhat prolonged mouth parts and the terminal part of antennae, have been figured by Kieffer.

Genus **Trichoperrisia** Kieff.

1913. *Trichoperrisia*, Kieffer, *Rec. Ind. Mus.*, IX, p. 199.
1913. *Trichoperrisia*, Kieffer, *Gen. Ins.*, fas. 152, p. 65.
1920. *Trichoperrisia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 10.
1925. *Trichoperrisia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 145.
1928. *Trichoperrisia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 3.

This genus is distinguished from the foregoing by its third vein uniting with costa at or near the apex of wing, by its 18 antennal segments and by its claws being longer than pulvilli. A single species, *pipericola* Kieff., was described by Kieffer from midges bred from leaf galls of *Piper nigrum* at Peradeniya, Ceylon.

Genotype.—Trichoperrisia pipericola Kieff.

Genus **Dasyneura** Rond.

1840. *Dasyneura*, Rondani, *Sopra acluni nuovi generi d'Insetti Ditteri*, p. 17.
1840. *Dasyneura*, Rondani, *Nuov. Ann. Soc. Bologna*, (2) VI, p. 12.
1908. *Dasyneura*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 340.
1913. *Dasyneura*, Kieffer, *Gen. Ins.*, fas. 152, p. 86.
1920. *Dasyneura*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 10.
1925. *Dasyneura*, Felt, *Bull. N. Y. St. Mus.*, No. 145.
1928. *Dasyneura*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 3.

This is the most typical genus of the tribe and includes about one hundred species, distributed all over the principal continental areas. The midges of this genus give rise to galls on fruits, buds and leaves. Many species are of considerable economic importance, due either to the injury they cause to cultivated plants or to checking the spread of weed pests. Only two species have so far been described from India.

The genus may be recognised by the following characters: Palpi quadriarticulate; antennal segments generally 14, circumfila not greatly produced; wings with three long veins not distinctly scaled, third vein uniting with costa well beyond the apex of wing and fifth vein forked; claws toothed on all legs; ovipositor long, sometimes longer than the body.

Genotype.—Dasyneura obscura Rond.

Key to species.

I. Antennal segments 12, fifth segment with a length about two and a half times its diameter, third palpal segment with a length three times the second, mesonotum yellowish-brown — *D. gossypii* Felt.

II. Antennal segments 14, fifth segment with a length about three-fourths greater than its diameter, third palpal segment one-half longer than second, mesonotum reddish-brown — *D. mangiferae* Felt.

Dasyneura gossypii Felt.

1916. *Dasyneura gossypii*, Felt, *Can. Entomol.*, XLVIII, p. 29.

This species is sometimes a minor pest of cotton. It infests the buds, causing them to wither and drop. It pupates in the withering buds.

Dasyneura mangiferae Felt.

1927. *Dasyneura mangiferae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.* X, p. 1.

This species is recorded to have been bred from galls on flowers of *Mangifera indica* Linn. No description of the gall is given. I have not come accross this midge.

Genus **Harpomyia** Felt.

1916. *Harpomyia*, Felt, *Can. Entomol.*, XLVIII, p. 40.
1920. *Harpomyia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 10.
1925. *Harpomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 146.
1928. *Harpomyia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 3.

This small genus, with only one species, falls between *Arnoldia* Kieff. and *Neuromyia* Felt in the group of genera with quadriarticulate palpi in Felt's key (76). It is easily recognised by its greatly produced, sickle-shaped harpes. The following are additional characters: Antennal segments 12, flagellate segments sessile in both sexes; thorax and abdomen not plainly covered with scales; third vein united with costa near the apex of wing; terminal clasp segment swollen.

Genotype.—Harpomyia indica Felt.

Harpomyia indica Felt.

1916. *Harpomyia indica*, Felt, *Can. Entomol.*, XLVIII, p. 401.

The special interest of this species is its peculiar food habit. It is recorded to have been bred from larvae found in the lining of an old felt cap. Whether the larvae actually fed on the substance of the felt cap or on some form of fungus growth on it is not definitely stated. If it is hereafter proved that the maggots had actually been feeding on the felt cap, the species would have to be classed as a potential household pest.

Tribe OLIGOTROPHIARIAE.

Genus **Oligotrophus** Latr.

1758. *Tipula (partim)*, Linne, *Syst. Nat.*, ed. 10, p. 588.
1805. *Oligotrophus*, Latreille, *Hist. Crust. Ins.*, XIV, p. 288.
1854. *Hormomyia (partim)*, Winnertz, *Stett. Entomol. Zeit.*, XV, p. 322.
1892. *Oligotrophus*, Rubsaamen, *Berl. Entomol. Zeit.*, XXXVIII, p. 376.
1908. *Oligotrophus*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 368.
1913. *Oligotrophus*, Kieffer, *Gen. Ins.*, fas. 152, p. 49.
1920. *Oligotrophus*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 9.
1925. *Oligotrophus*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 149.
1928. *Oligotrophus*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 2.

This genus comprises a number of midges closely approaching *Dasyneura* Rond. and *Rhabdophaga* West. but differing in their simple claws on all legs. They may be recognised by the following characters: Palpi triarticulate; third and fourth antennal segments not fused; empodium twice as long as claws; ovipositor not chitinised, truncate and apically without any distinct pocket; terminal clasp segment apical and small.

Genotype.—Olygotrophus juniperinus (Linn.).

Only one species, *saligneus*, is known in the adult stage from India. The authorship of this species is not definitely known but is generally ascribed to de Niceville, but no description of this species has ever been published. Kieffer has erected a number of species on larval and pupal characters, but described no adults. The genus as a whole requires revision.

List of species.

O. saligneus de Niceville (?) (1903) *Ind. Mus. Notes*, V, p. 151 ; Lefroy, (1909) *Ind. Ins. Life*, p. 582, fig. 377.
O. indicus Kieff. (1908) *Marcellia*, VII, p. 152.
O. mangiferae Kieff. (1908) *Marcellia*, VII, p. 15.
O. quadrilobatus Kieff. (1908) *Marcellia*, VII, p. 151.
O. tenuispatha Kieff. (1908) *Marcellia*, VII, p. 150.

Genus **Panteliola** Kieff.

1869. *Cecidomyia* (*partim*), Osten Sacken, *Trans. American Entomol. Soc.*, II, p. 302.
1893. *Rhopalomyia* (*partim*), Rubsaamen, *Berlin Entomol. Zeit.*, XXXVIII, p. 162.
1905. *Rhopalomyia* (*partim*), Kieffer, *Ann. Soc. Sc. Bruxelles*, XXIX, p. 151.
1913. *Panteliola*, Kieffer, *Bull. Soc. Nat. Hist. Metz.*, XXVIII, p. 49.
1913. *Panteliola*, Kieffer, *Gen. Ins.*, fas. 152, p. 46.
1920. *Panteliola*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 9.
1928. *Panteliola*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 2.

This genus comprises about five species, most of which were originally referred to the genus *Rhopalomyia* Rubs. It is closely related to *Misospatha* Kieff., which it resembles in all characters, except in its biarticulate palpi.

Genotype.—Panteliola hassi (Kieff.).

Panteliola hassi (Kieff.).

1905. *Rhopalomyia hassi*, Kieffer, *Ann. Soc. Sc. Bruxelles*, XXIX, p. 151.
1913. *Panteliola hassi*, Kieffer, *Bull. Nat. Hist. Soc. Metz.*, XXVIII, p. 49.

This species is recorded as having been bred from galls on the shoot of *Artemisia herba-alba*. It is erroneously described as a Bengal species, for it was collected at Tuticorin, South India.

Tribe ASPHONDYLARIAE.

Genus **Schizomyia** Kieff.

1889. *Schizomyia*, Kieffer, *Entomol. Nachr.*, XIV, p. 183.
1908. *Schizomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 378.
1913. *Schizomyia*, Kieffer, *Gen. Ins.*, fas. 152, p. 88.
1916. *Schizomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 186, p. 102.
1920. *Schizomyia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 10.
1925. *Schizomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 151.
1928. *Schizomyia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 4.

The midges of this genus breed in leaf, flower or fruit galls. Four species have so far been described from India. One new species is described below.

The genus is recognised by the following characters : Palpi quadriarticulate. Antennal segments 14, cylindrical, sessile or sub-sessile. Flagellate segments of male with whorls of long hairs and stout, raised

and highly convolute circumfili. Terminal antennal segments of female reduced and shortened. Terminal clasp segment of male genitalia unidentate. Basal clasp segment projects beyond the insertion of terminal clasp segment. Ovipositor aciculate, with a basal fleshy part but without dorsal pouch and lamellae. Ventral sclerite of seventh abdominal segment somewhat strongly chitinised. Larval breast-bone bidentate.

Genotype.—Schizomyia galli Kieff. (By original designation.)

Key to species.

Felt (29) has separated the species of this genus by the colour of their abdomen. As it is difficult to determine the colour of spirit specimens, I have used the more satisfactory character of the pulvilli in the following key. The two species, *incerta* and *indica* of Kieffer (105), described from larvae only, are not included in this key.

I. Pulvilli rudimentary.	
A. Antennae three-fourths the length of body, fifth antennal segment with a length two and half times its diameter	*S. maeruae* Felt.
B. Antennae as long as body, fifth antennal segment with a length four times its diameter	*S. assamensis* Felt.
II. Pulvilli well developed, shorter than claws	*S. acaciae*, sp. nov.

Schizomyia maeruae Felt.

1926. *Schizomyia maeruae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, IX, p. 243.

This species was bred by Ballard from galls on *Maerua arenaria* H. F. & T. at Coimbatore, South India. This species appears to be somewhat peculiar on account of the absence of chitinisation of the ventral sclerite of the seventh abdominal segment. It is probably associated with a cluster gall on the flowers of *Maerua arenaria* H. F. & T., which I collected at Tanjore, South India, but unfortunately no midges could be reared out of it.

Schizomyia assamensis Felt.

1920. *Schizomyia assamensis*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 3.

This species was bred by Fletcher from galls on leaves of *Rubus assamensis* at Shillong, Assam, East India. It is remarkable on account of its thicklyhaired sub-median lines.

Schizomyia acaciae, sp. nov.

(Plate VII, fig. 1.)

This new species is described from a single female bred from tomentose gall on leaves of *Acacia leucophloea* Willd. It is remarkable on

account of its heavily chitinised ventral sclerite of the seventh abdominal segment.

Female.— 1 mm. long. Body dark brown and densely hairy. Antennae one-fourth the length of body, segments 14, fourth, fifth and sixth segments sub-equal, seventh a little shorter than sixth, terminal segment globose. First palpal segment broadly ovoid, stout and with a length about twice its diameter; second segment longer and more slender; third and fourth segments sub-equal and a little longer than second. Mesonotum black. Claws simple and slender. Pulvilli about half the length of claws. Ovipositor one-fifth the length of body. Ventral sclerite of seventh abdominal segment heavily chitinised.

Holotype.—Female, partly dissected on slide. No. $\frac{990}{H\ 6}$.

Type-locality.—A scrub-jungle near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 15. vii. 1932.

Galls.—This new gall, for which the name tomentose gall has been proposed, is rather remarkable on account of its being formed by the cell proliferation and fusion of two adjacent leaflets on the same side of the pinna. It is thickly clothed with a brown tomentum.

8 mm. long and 5-6 mm. thick. Regular, simple, collective or compound; pyriform, shortly sub-cylindrical or hour-glass shaped, ventricose, externally bilobed; sessile or with two short petioles; solid, indehiscent uni- or bilocular and acystiferous. Alternate, opposite, scattered or crowded on the secondary rachis to the extent of about 30 galls per leaf. Covered with a dark yellowish-brown or reddish-brown tomentum on the surface and apically with a pair of short, narrow and oblong or broad, long and sagitate, dark green, foliaceous wings, which represent the normal apical portions of the leaflets.

There is a thick cortex of several layers of large, round or hexagonal simple parenchymatous cells, with chloropyll. The cells of the outermost layer of this cortex grow into the tomentose hairs. Palisade and spongy parenchymae of the normal leaflets are completely degenerated. Numerous groups of vascular bundles, resulting from the degeneration of veins, are arranged in the form of a broken ring, as in stems. This ring separates the cortex from the inner, white, annular, medulla of small proliferating cells. The central part is hollow and forms the cavity of the gall. Sometimes there are two such spaces in the medulla, representing the two cells of the gall.

Life-history.— Eggs are laid on the tender buds. Larvae hatch out from them on the third day. They lie in between two minute, closely applied leaflets and absorb nourishment from both of them. This occasions cell proliferation in the two leaflets, which soon swell out near the base and fuse together. The tomentum on the surface of the gall appears in about a week. The larval period is a long one and extends over two months. The pupation is in the galls and takes about five days. Before pupating, the larvae bore a hole to the outside, so as to facilitate the easy escape of the adult. There appear to be two generations, one in summer and another in rainy season. Pupae are parasitised by Hymenoptera through the holes made by the larvae for the escape of the adult midge.

Genus **Asphondylia** H. Loew.

1818. *Cecidomyia* (*partim*), Meigen, *Syst. Beschr.*, I, p. 98.
1850. *Asphondylia*, Herman Loew, *Diptera Beitrage*, IV, p. 21.
1853. *Asphondylia*, Winnertz, *Linn. Ent.*, VIII, p. 187.
1856. *Phyllophaga*, Rondani, *Dipt. Ital. Prodr.*, I, p. 199.
1862. *Asphondylia*, Osten Sacken, *Mon. N. Amer. Dipt.*, I, p. 176.
1863. *Cylindracera*, Lioy, *Atti. Inst. Veneto*, (3) IX, p. 503.
1864. *Asphondylia*, Schiner, *Fauna Austriaca*, II, p. 395.
1869. *Asphondylia*, Osten Sacken, *Trans. American Entomol. Soc.*, p. 209.
1908. *Asphondylia*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 375.
1913. *Asphondylia*, Kieffer, *Gen. Ins.*, fas. 152, p. 91.
1913. *Monasphondylia*, Kieffer, *Gen. Ins.*, fas. 152, p. 95.
1916. *Asphondylia*, Felt, *Bull. N. Y. St. Mus.*, No. 186, p. 144.
1920. *Asphondylia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 10.
1925. *Asphondylia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 151.
1928. *Asphondylia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 4.

This is a large genus, with a world-wide distribution. It comprises medium- or large-sized, brown, red or black coloured midges, which breed by preference in leaf and flower galls. Seven Indian species of this genus have been described so far. Some of these species are likely to be of economic importance, such as the sesamum gall fly, *Asphondylia sesami* Felt, which often becomes a pest. Three new species are described below.

The genus is closely related to *Schizomyia* Kieff., which it resembles in its protractile, aciculate ovipositor and in the general structure of the antennae but differs in the lobed, dorsal pouch at the base of its ovipositor and in its palpi not being quadriarticulate. The midges of this genus may be recognised by the following characters : Palpi tri- bi- or rarely uniarticulate. Antennal segments 14, elongate, cylindrical and sessile ; terminal segments of male slightly reduced ; terminal segments of female greatly reduced, the last segment subglobose or sometimes even disc-shaped. Circumfila of female consist of two simple bands, one low basal band connected by a branch produced on one side of the segment with a low apical band. Circumfila of male very highly tortuous. Third vein united with costa near the apex of wing. Claws simple. Terminal clasp segment of male genitalia short, stout, swollen near the middle, uni- or bidentate and strongly chitinised apically. Ovipositor aciculate, protractile and with a lobed, dorsal pouch, not vesiculate basally, situated at the proximal end.

Genotype.—Asphondylia sarothamni (H. Loew).

Key to species.

I. Palpi biarticulate.

A. Pulvilli shorter than claws . . . *A. morindae* Mani.

B. Pulvilli as long as claws.

1. Fifth antennal segment with a length about seven times its diameter in male and five times in female — *A. sesami* Felt.
2. Fifth antennal segment with a length about five times its diameter in female — *A. utriculae*, sp. nov.

C. Pulvilli as long as claws in fore and longer than claws in hind legs . . *A. riveae*, sp. nov.

II. Palpi triarticulate.

A. Pulvilli shorter than claws	*A. lantanae* Felt.
B. Pulvilli as long as claws.	
1. Second and third palpal segments equal.	
a. Mesonotum shiny black, sub-median lines thickly haired in female	*A. osbeckiae* Senior-White.
b. Mesonotum dark brown, sub-median lines sparsely haired in male	*A. trichocecidarum*, sp. nov.
2. Second and third palpal segments unequal.	
a. Terminal clasp segment unidentate	*A. ipomoeae* Felt.
b. Terminal clasp segment bidentate	*A. pongamiae* Felt.
C. Pulvilli longer than claws	*A. phyllanthi* Felt.

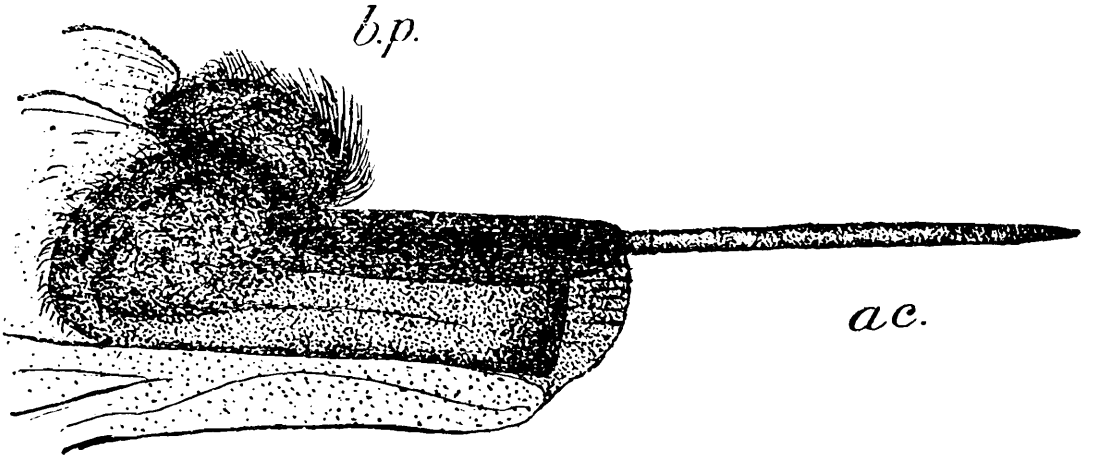
Asphondylia morindae Mani.

(Plate VII, fig. 2 and Text figs. 13 and 14).

1934. *Asphondylia morindae*, Mani, *Ann. Mag. Nat. Hist. London*, (10) XIII, pp. 134-137, figs. A and B.

This species attacks the inflorescence of *Morinda tinctoria* Roxb. and produces large, globose, fleshy galls, very closely resembling the normal fruits. Its galls may be distinguished from the true fruits of

TEXT-FIG. 13.—*Asphondylia morindae* Mani. Claws and related structures. (Highly magnified.)



TEXT-FIG. 14.—*Asphondylia morindae* Mani. Ovipositor ; *ac.* acicula ; *b.p.* basal pouch

Morinda by the absence of seeds and by the presence of maggots inside them. Though I have already given figures of the gall, I have not described it so far.

Galls.—There are three distinct varieties of this gall: solitary, compound and in clusters.

Solitary variety :—This type of gall is formed when one or two flowers in the inflorescence are attacked. The thalamus swells into globose, pyriform, fleshy galls about 20-30 mm. in diameter.

Clustered variety :—This type of gall is due to several flowers of the same inflorescence being attacked. Several globose, fleshy galls form and are found clustered on the top of the peduncle. Each gall is separate from the other and there is no fusion of the product of different flowers.

Compound variety :—In this type of gall almost all the flowers of the inflorescence grow very close together into galls, which fuse into one single, large, irregular mass. The galls of the individual flowers are not distinguishable, but their extent is marked out on the surface by green lines enclosing irregular areas, as in the case of the true fruits. This variety is very much larger than the other two and sometimes reaches 50 mm. in diameter.

All the varieties are solid, fleshy, acystiferous and indehiscent. Centres of cell proliferation are thalamus, base of corolla and calyx. Ovary and stamens are completely degenerated. Vascular bundles are scattered irregularly in a parenchyma of several layers of large, hexagonal cells.

Life-history.—Eggs are laid on the tender inflorescence. Maggots hatch from them on the second or the third day. They penetrate the young flower buds and bore their way down to the thalamus through the corolla. This occasions the formation of galls. The larval period is a long one and occupies about two and half months. Pupation takes place below the epidermis of the gall. Pupal period is nine days. Pupae are heavily parasitised by Chalcids.

Asphondylia sesami Felt.

1916. *Asphondylia sesami*, Felt, *Can. Entomol.*, XLVIII, p. 31.

This midge infests the flowers, buds and fruits of *Sesamum indicum* Linn. and gives rise to wrinkled and twisted galls. Corolla and stamens degenerate and seeds fail to form. Fletcher (79) regards this species as a minor pest.

Asphondylia utriculae, sp. nov.

(Plate VII, fig. 3.)

This new species gives rise to utricle or bladder-like galls on the ovary of *Dichrostachys cineria* W. & A. It is described from a single female bred from these galls.

Female.— 2·5 mm. long. Antennae about three-fourths the length of body, segments 14 ; fifth segment with a length five times its diameter and somewhat thicker apically than basally ; sixth segment with a length a little over three times its diameter and with a very short stem ; seventh segment nearly equal to the sixth and with a stem a

little longer than that of the sixth ; twelfth segment with a length one-quarter greater than its diameter and a little less than three-fourths the length of eleventh ; thirteenth segment short, stout and with a length almost equal to its diameter ; terminal segment oblate, with a length one-fourth less than its diameter. Palpi biarticulate ; first segment short, stout, with a length two-fifths greater than its diameter and with a basal whorl of long slender setae and an apical whorl of shorter setae ; second segment over twice as long as the first and six times its own diameter, slender and setose beyond its basal fourth. Mesonotum dark brown. Scutellum setose. Abdomen sparsely setose. Claws sharply bent and as long as pulvilli.

Holotype.—Female, in spirit. No. $\frac{991}{H\,6}$

Type-locality.—A scrub-jungle near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 14. i. 1931.

Galls.—These galls, not recorded previously, are homologically the monocarpellary ovaries of the flowers in the spicate inflorescence.

10 mm. long and 5 mm. thick. Regular, globose or pyriform, sessile or sub-sessile, utricular, unilocular, indehiscent, free structures, crowded in large numbers towards the apical portion of the peduncle. Green, pubescent, sometimes villous ; basally cupiferous, apically caudate ; bladder tough, coriaceous and moderately thick. Large holes, with the exuvium projecting through them are found on old galls. Mechanical tissues are not developed in the bladder. Parenchymatous cells are increased. A single larva of the midge was found in the cavity of the gall.

The basal cup represents the atrophied calyx. Dried-up stamens are found as numerous brown hairs surrounding the galls. The apical tail is the style of the flower.

Life-history.—Not known in detail. Larval period appears to be short, and is presumably about fifteen to twenty days. Pupation takes place within the galls and takes five to six days. Hymenopterous parasites, chiefly Braconidae, were reared from the galls.

Asphondylia riveae, sp. nov.

This new species gives rise to large spongy galls on the leaves of *Rivea hypocrateriformis* Choisy. The description is based on a somewhat mutilated male bred from the galls.

Male.— 2 mm. long. Body dark brown. Antennae distal part broken ; third segment with a length five times its diameter ; fourth segment somewhat stouter and one-fourth shorter than third ; fifth segment with a length three times its diameter. Palpi biarticulate ; first segment short, stout, cylindrical and thickly setose ; second segment sub-fusiform, twice as long as first and thickly setose. Mesonotum black, sub-median lines thickly haired. Scutellum and post-scutellum black. Claws slightly bent in fore- and mid-legs and sharply bent in hind legs. Pulvilli as long as claws in fore legs and longer than claws in hind legs. Abdomen dark brown and moderately hairy. Genitalia black ; basal clasp segment sub-trapezoid, one and half times as long as broad and rather thickly setose ; terminal clasp segment sub-globose, unidentate and rather heavily chitinised.

Holotype.—Male, on slide. No. $\frac{992}{H\,6}$

Paratypes.—Two males, in spirit. No. $\frac{993}{H\,6}$

Type-locality.—A scrub-jungle, near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 30. xii. 1928.

Galls.— 75 mm. long and 20 mm. thick. Regular, globose, ovoid, ellipsoid or rarely irregular ; pale or yellowish-green and sometimes mottled with brownish-red or violet, marked with a net-work of dark green ; glabrous, very rarely verrucose, with circular holes on old ones ; solid, white, spongy, acystiferous and indehiscent ; dorsally ribbed, ventrally sulcate and narrowly alate, apically also alate.

Occasionally the galls are long, sub-cylindrical and bright yellow.

These galls are really the leaves and are formed by cell proliferation and fusion of the folded halves on either side of the midrib. The surface of the gall is the underside of leaves. The dorsal ridge represents the midrib, while the wings represent normal portions of the leaves.

The epidermis encloses a well developed palisade parenchyma of moderately long cells. This palisade is really formed out of the spongy parenchyma of the normal leaf. By gall formation the leaf is folded along the midrib on the upper side, thus enclosing the normal palisade. The normal spongy tissue appears on the outside of the gall and being exposed to rays of the sun, the cells lengthen out and take the shape and function of palisade cells. The normal palisade cells degenerate and become lost in the thick parenchyma in the interior of the gall. They lose their chlorophyll and cease functioning. The whole mass of the gall is made of large, irregular parenchymatous cells, with large air spaces between them. The veins of the leaf are not degenerated and may be found scattered irregularly in the parenchyma of the gall. Numerous larvae of the midge are found in the deep interior of the gall.

Life-history.—Numerous eggs are laid between the folds of the unopened leaves in the buds. Larvae hatch out on the fourth or fifth day. They attack the palisade surface of the leaf on either side of them. This occasions cell proliferation in the latter and the two portions are bound together. The larvae continue to develop in the galls thus formed for over three months and then pupate at various depths in the gall. Pupal period occupies about ten days. Before the adults emerge, the pupae wriggle their way through the spongy cells to the surface of the gall and with the help of the antennal horns pierce the epidermis, thus facilitating the escape of the adult midges. The larvae and pupae and presumably also the adults are very heavily parasitised by Chalcids. When larvae are parasitised, the gall remains very small and contorted. There is only one generation in the year. The midges appear to hibernate during the hot summer months and part of the rainy season. Galls appear from September to March.

Asphondylia lantanae Felt.

1920. *Asphondylia lantanae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 2.

This species breeds in the flowers of *Lantana indica* and *Lantana camara* in very large numbers. Ramachandra Rao (141) considers

this species as of very little value in the control of *Lantana*. This is partly due to the fact that the midges are very heavily parasitised by Chalcids, so that the midges do not appreciably reduce the seed production of *Lantana*. Recently, however, I (127) have observed that in the absence of the parasites, this species is able to control *Lantana* to an appreciable extent.

Asphondylia osbeckiae Senior-White.

1920. *Asphondylia osbeckiae*, Senior-White, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, pp. 83, 107, pl. XV, fig. 1.

This species was described from a single female taken on the flower of *Osbeckia*, at Shillong, Assam. Senior-White describes the ovipositor as peculiar and his figure shows the terminal aciculate portion bent sharply at right angles to the basal part. This character and the structure of the circumfila described by Senior-White are not strictly typical of this genus, and presumably this midge may have to be referred to a new genus.

Senior-White describes the palpi as biarticulate disregarding the basal segment, which he is inclined to take as palpiger. The general view, however, is to describe the basal joint as the first segment. The palpi are thus in reality triarticulate, under which category I have placed this species in the key.

Asphondylia trichocecidarum, sp. nov.

(Text-fig. 15.)

This new species gives rise to trichocecidia or hairy galls on the leaves of *Acacia leucophloea* Willd.

Male.—1 mm. long, dark yellowish-brown and moderately setose. Antennae as long as body; segments 14; fifth segment with a stem one-seventh the length of the enlargement, which latter has a length twice its diameter; sixth segment a little shorter than fifth; seventh segment as long as sixth; eleventh segment with a length twice its diameter and with a stem one-sixth the length of enlargement; twelfth segment as long as eleventh, a little more slender and with a longer stem; terminal segment with a length twice its diameter and evenly rounded at the tip. Palpi triarticulate; first segment stout, with a length a little over twice its diameter; second segment more slender, reduced towards apex, with a length four times its diameter; third segment stouter than the second and nearly as long. Mesonotum dark brown. Scutellum brown. Halteres fuscous yellow. Femur yellow. Tibia and tarsus darker. Claws simple as long as pulvilli. Genitalia fuscous-yellow basally and darker apically; terminal clasp segment spatulate, unidentate and shortly setose.

Holotype.—Male, partly dissected on slide. No. $\frac{994}{H\ 6}$

Type-locality.—A scrub-jungle near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 31. viii. 1931.

Galls.—The galls of this species are formed by cell proliferation and the fusion of two adjacent, closely applied leaflets of the same side of

the secondary rachis on the pinna. They are small hairy balls greatly resembling the flower heads of the plant.

3 mm. in diameter. Regular, globose or pyriform ; sessile, light brown, densely hairy ; hard, solid, acystiferous, indehiscent, uni- or bilocular, apically bialate ; free and solitary, paired or crowded on the pinna.

Text-fig. 15.—*Asphondylia trichocecidarum*, sp. nov. Trichocecidia on leaves of *Acacia leucophloea* Willd.

The palisade and spongy parenchymae of the leaflets completely degenerated. Epidermal cells, derived from the spongy side of one leaflet and palisade side of another leaflet, converted into the hairy out-growths. Hairs brownish, villous, slightly tapering towards their tips and multicellular. Basal cells of the hairs colourless and full of protoplasm, terminal cells dead and brown. Below the epidermal layer a moderately broad parenchyma of hexagonal cells surrounds an inner circular zone of smaller, proliferating cells. The cells of the parenchyma contain chlorophyll and some of the outermost layers are modified into a somewhat short palisade tissue, though they are in reality derived from the spongy cells of the normal leaflets. Veins are scattered in the form of a ring in the parenchyma, as in the ordinary dicotyledonous stem.

Asphondylia ipomoeae Felt.

1926. *Asphondylia ipomoeae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, IX, p. 243.

This species was bred from galls on *Ipomea staphylina* R. & S. I refer to this species two midges bred by me from galls on buds and leaves of *Ipomea staphylina* R. & S. taken at Erode and Tanjore, South India. The galls have not been described so far. They are globose or pyriform, coriaceous, unilocular, greenish structures on the upper surfaces of leaves, always connecting together the two halves

of the leaves on either side of the midrib by a very slender pedicel. They are about 5-7 mm. in diameter.

Asphondylia pongamiae Felt.

1921. *Asphondylia pongamiae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 24.

This species was bred by Ramakrishna Ayyar from flower galls of *Pongamia glabra* Vent. The galls are described as globose, 1-2 mm. in diameter and with a thin shell. I have not come across this species.

Asphondylia phyllanthi Felt.

1920. *Asphondylia phyllanthi*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 2.

This species is recorded to have been bred by Ramachandra Rao from shiny, globose galls on leaves and shoot of *Phyllanthus emblica* Linn. in Burma. It does not appear to occur in other parts of India.

Genus **Daphnephila** Kieff.

1905. *Daphnephila*, Kieffer, *Ann. Soc. Sc. Bruxelles*, XXIX, p. 144.
1913. *Daphnephila*, Kieffer, *Gen. Ins.*, fas. 152, p. 96.
1920. *Daphnephila*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 11.
1925. *Daphnephila*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 153.
1928. *Daphnephila*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 5.

This genus is recognised by its tri- or quadriarticulate palpi, bidentate and sub-apical terminal clasp segment and by its exserted, conical ovipositor with apical lobes or triangular plates. Kieffer (103) has described three species, *haasi*, *glandifex* and *lindrae*, from India. The location of types is not known.

Genotype.—Daphnephila hassi Kieff. (By original designation.)

Key to species.

I. Palpi triarticulate.	
A. Palpal segments equal	*D. lindrae* Kieff.
B. Palpal segments distinctly unequal	*D. haasi* Kieff.
II. Palpi quadriarticulate	*D. glandifex* Kieff.

Tribe ITONIDIDINARIAE.

Sub-tribe *BIFILA.*

Genus **Indodiplosis** Felt.

1916. *Indodiplosis*, Felt, *Can. Entomol.*, XLVIII, p. 403.
1920. *Indodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 13.
1925. *Indodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 154.
1928. *Indodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 9.

This genus approaches *Erosomyia* Felt in its greatly lengthened wings and toothed claws on all legs but differs in its claws being unidentate. Only one species, *mangiferae*, has been described so far. It may be recognised by its eight circumfila loops.

Genotype.—Indodiplosis mangiferae Felt. (By original designation.)

Genus **Streptodiplosis** Felt.

1916. *Streptodiplosis*, Felt, *Can. Entomol.*, XLVIII, p. 405.
1920. *Streptodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 13.
1925. *Streptodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 154.
1928. *Streptodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 9.

This is a small genus related to *Lobopteromyia* Felt, which it resembles in its broad wings, but is distinguished by the stems of the male antennal segments being longer than twice their diameters and by its convolute heavily chitinised harpes. From *Indodiplosis* it may be distinguished by its simple claws. The palpi are quadriarticulate. Wings of male are broadly rounded posteriorly and the costa is not thickened basally.

Only one species, *indica*, has been described from Wynaad, South India. It is recorded to have been bred from an undetermined plant infested by the scale-insect, *Mytilapis piperis* Green, on which it is presumably predaceous.

Genotype.—Streptodiplosis indica Felt. (By original designation.)

Genus **Thurauia** Rubs.

1899. *Thurauia*, Rubsaamen, *Wein. Entomol. Zeit.*, XVIII, p. 58.
1913. *Thurauia*, Kieffer, *Gen. Ins.*, fas. 152, p. 175.
1925. *Thurauia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 155.

This genus has not been previously recorded from India. It resembles *Streptodiplosis* Felt in its simple claws and costa not thickened basally but differs in the length of its wing exceeding its breadth. Palpi quadriarticulate. Ovipositor greatly produced and chitinised. One new species is described below.

Genotype.—Thurauia acquatica Rubs. (By original designation.)

Thurauia chilkaensis, sp. nov.

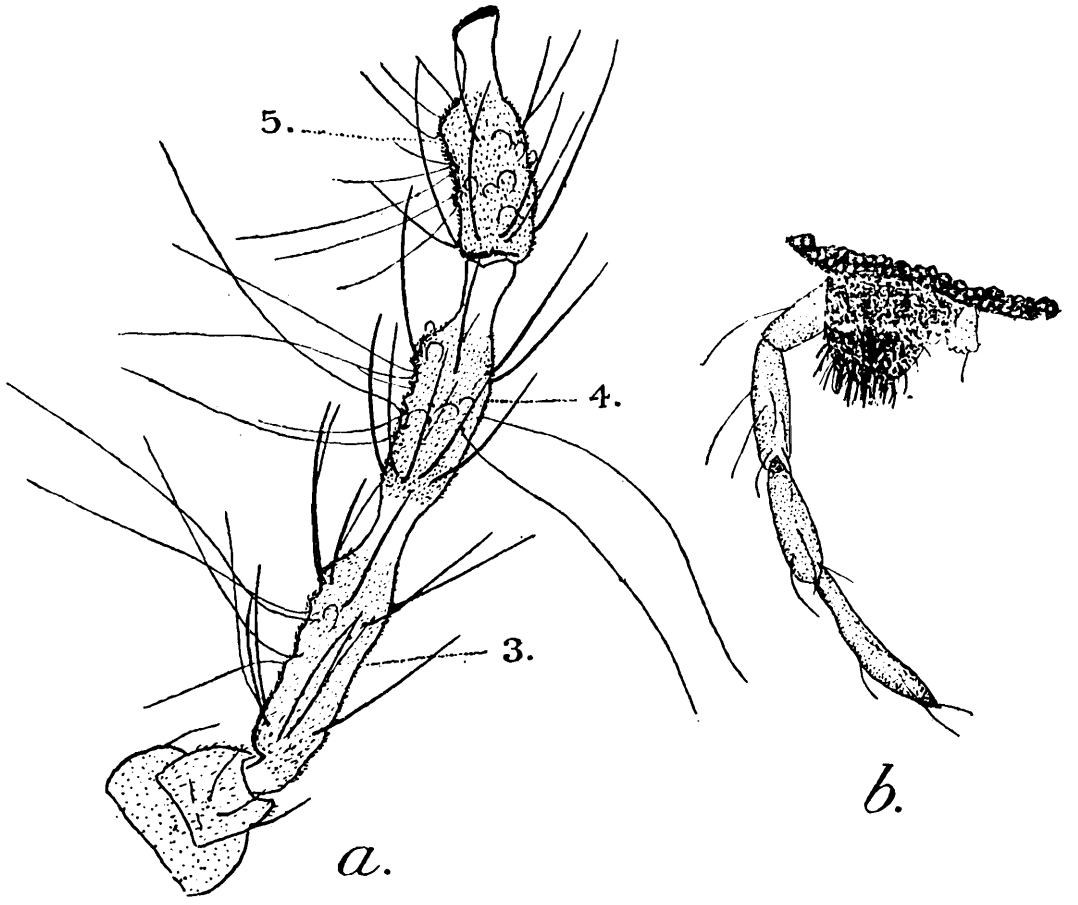
(Text-figs. 16 and 17.)

This new species is remarkable for its ovoviviparous habit, which has not previously been observed in adult gall midges.[1]

Female.— 2·5 mm. long. Body dark brown. Antennae half the length of body ; segments 14 ; third and fourth segments fused, the former with a stem one-fourth the length of enlargement, which has a length four times its diameter, the latter segment three-fourths the length of third and with a stem one-half the length of enlargement ; fifth segment with a stem three-fourths the length of enlargement, which latter has a length about twice its diameter ; terminal segment with a length four times its diameter and with a constriction beyond the basal third. Palpi rather long, quadriarticulate ; first segment with a length about four times its diameter ; second segment one-half longer than first and nearly as stout ; third segment as long as second, somewhat slender basally, sparsely setose ; fourth segment one-third longer than third, reduced both basally and apically and sparsely setose. Mesonotum brown. Scutellum yellowish-brown. Claws simple and as

[1] Mani, M. S. *Current Science*, III, p. 109, (1934).

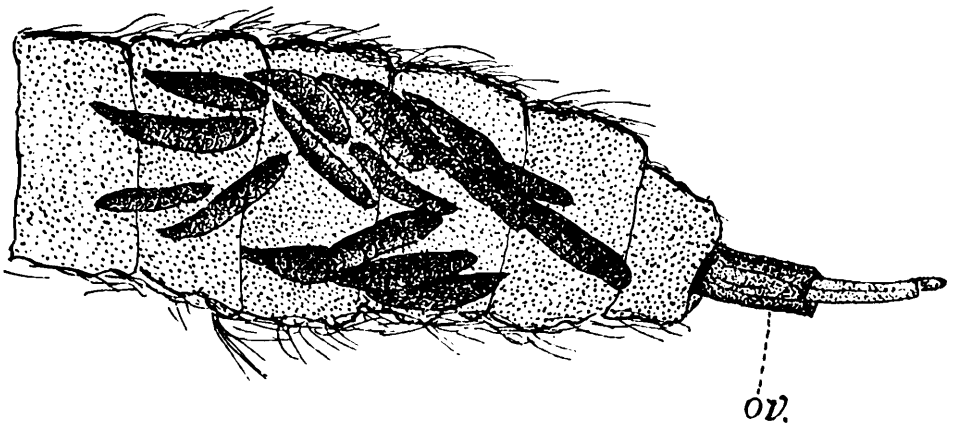
long as empodium. Abdomen yellowish and sparsely setose. Ovipositor about one-fourth the length of abdomen.



TEXT-FIG. 16.—*Thurauia chilkaensis*, sp. nov. *a*. antennal segments of female ; *b*. palpus and mouth parts of female.

Holotype.— Female, on the same slide as the holotype of *Prolasioptera annandalei*, sp. nov., described above. No. $\frac{995}{H\,6}$.

Type-locality.— Barkuda Island, Chilka Lake, Madras Presidency, South India. Coll. N. Annandale.



TEXT-FIG. 17.—*Thurauia chilkaensis*, sp. nov. Abdomen of female showing living larvae hatched inside.

Life-history.— After the pairing of the midges, eggs are fertilised, but are not deposited. Larvae hatched from them are retained and

nourished inside the abdominal cavity of the mother. The maggots are deposited after about twelve days on decaying vegetable matter. When freshly extruded, they are about 1 mm. long and yellowish-white in colour. Some of them are already in a far advanced state of development and immediately pupate. Others, however, feed on the decaying vegetable matter and pupate after a further period of development extending over a month. The adults emerge in about five days.

Genus **Endaphis** Kieff.

1896. *Endaphis*, Kieffer, *Bull. Soc. Entomol. France*, p. 383.
1911. *Endaphis*, Felt, *Entomol. News*, XXII, p. 128.
1913. *Endaphis*, Kieffer, *Gen. Ins.*, fas. 152, p. 171.
1920. *Endaphis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 8.
1925. *Endaphis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 155.
1928. *Feltodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 8.
1928. *Endaphis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 8.

Senior-White regards *Endaphis* Kieff. as a synonym of *Feltodiplosis* Kieff. *Endaphis* Kieff. is a genus of the sub-tribe Bifila, while the latter belongs to the sub-tribe Trifila. They are therefore widely separated and are not related to each other. The type of the genus is not *Feltodiplosis abdominalis*, as given by Senior-White, but *Endaphis perfidus* Kieff.

The midges of this genus are distinguished from those of *Thurauia* Rubs. by the wings being neither too broad nor too narrow. Palpi quadriarticulate. First antennal segment with a conspicuous dorsal tooth. Costa thickly scaled and not thickened basally. Terminal clasp segment sub-cylindrical. Dorsal plate roundly bilobed and shorter than ventral plate. Lamellae of ovipositor thick and long.

Only one species of this genus, *hirta*, is described by Felt (37) from India. It is recorded to have been bred from the scale-insect, *Dactylopius* sp., on *Mimusopa hexandra* Roxb. and is likely to prove a possible control of the scale-insect.

Genus **Contarinia** Rond.

1860. *Contarinia*, Rondani, *Atti. Soc. Sc. Nat. Milano*, II, p. 287.
1894. *Eudiplosis*, Kieffer, *Bull. Soc. Entomol. France*, LXIII, p. 28.
1894. *Stictodiplosis* (*partim*), Kieffer, *Bull. Soc. Entomol. France*, LVIII, p. 28.
1896. *Contarinia*, Kieffer, *Wein. Entomol. Zeit.*, XV, pp. 94, 98-99.
1900. *Contarinia*, Kieffer, *Ann. Soc. Entomol. France*, XLIX, p. 447.
1908. *Contarinia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 390.
1913. *Contarinia*, Kieffer, *Gen. Ins.*, fas. 152, p. 178.
1918. *Contarinia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 93.
1920. *Contarinia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 270.
1925. *Contarinia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 155.
1928. *Contarinia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 10.

This genus is of considerable economic importance and includes many injurious species. *C. pyrivora* Rond., a European species introduced into America about 1877, is reported to be highly injurious to pear in the New York State. *C. johnsoni* Sling similarly causes occasionally severe injury to Moore Grapes in America. In India, *C. andropoginis* Felt is likely to prove a pest under favourable conditions. About forty species of this genus, of which two are from India, have been described so far.

This genus is distinguished from *Endaphis* Kieff. by its unscaled costa and untoothed first antennal segment. According to original description this genus is characterised by the sub-equal nodes of its antennal segments, its two whorls of uniform circumfila and by its third vein interrupting costa at the apex of wing. Palpi quadriarticulate. Pulvilli shorter than claws. Ovipositor apparently aciculate. Dorsal and ventral plates bilobed.

Genotype.—Contarinia loti Rond. (By original designation.)

Key to species.

I. Pulvilli nearly as long as the strongly curved claws, fifth antennal segment of male with stems equal to and one-half times greater than their diameters	*C. caudata* Felt.
II. Pulvilli nearly half the length of the slightly curved claws, fifth antennal segment with stems each one-quarter longer than their diameters	*C. andropoginis* Felt.

Contarinia caudata Felt.

1920. *Contarinia caudata*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 4.

This species is recorded to have been bred from ear-heads of *Apluda varia* Hack and *Andropogon schaemanthus* at Coimbatore, South Indio. I refer to this species a series of midges bred by me from galls on *Andropogon contortus* at Tanjore, South India. It is a reddish-brown midge about 2-2·5 mm. long., with the scutellum and post scutellum of male yellowish-brown. It is represented in Ramachandra Rao collection.

Contarinia andropoginis Felt.

1921. *Contarinia andropoginis*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 25.

This species attacks the ear-head of *Andropogon sorghum* (*cholam*) in South India. I refer to this species four midges bred by me from *cholam* taken at the Borstal School Farm, Tanjore, South India. The midges are relatively smaller, dark or dark yellowish-brown with the scutellum also concolourous.

Genus **Stictodiplosis** Kieff.

1894. *Stictodiplosis*, Kieffer, *Bull. Soc. Entomol. France*, LXIII, p. 28.
1913. *Stictodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 183.
1920. *Stictodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 13.
1925. *Stictodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 155.
1928. *Stictodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 10.

This genus is closely related to *Contarinia* Rond., from which it is distinguished by its spotted wings. About a dozen species, mostly from Europe, have been described so far. One species, *pulcherima*, was described by Kieffer (106) from India.

Genotype.—Stictodiplosis nubilipennis Kieff. (By original designation.)

Genus **Procontarinia** Kieff. & Cecc.

1906. *Procontarinia*, Kieffer & Cecconi, *Marcellia*, V. p. 135.
1913. *Procontarinia*, Kieffer, *Gen. Ins.*, fas. 152, p. 183.
1920. *Procontarinia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 13.
1925. *Procontarinia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 155.
1928. *Procontarinia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 10.

This genus is also closely related to *Contarinia* Rond., from which it is distinguished by the basal triangular lobe on its basal clasp segment and by the semicircular ventral piece on its short ovipositor. The only species of this genus, *matteiana* Kieff. & Cecc., was described from India.

Genotype.—Procontarinia matteiana Kieff. & Cecc.

Genus **Dentifibula** Felt.

1907. *Contarinia (partim)*, Felt, *Bull. N. Y. St. Mus.*, 110, p. 132.
1908. *Dentifibula*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 389.
1911. *Dentifibula*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 51.
1913. *Dentifibula*, Kieffer, *Gen. Ins.*, fas. 152, p. 174.
1918. *Dentifibula*, Felt, *Bull. N. Y. St. Mus.*, No. 202, p. 129.
1920. *Dentifibula*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 13.
1925. *Dentifibula*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 157.
1928. *Dentifibula*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 9.

This genus was erected by Felt for midges closely related to *Contarinia* Rond., but differing in their triarticulate palpi and conspicuous, triangular apical process on their basal clasp segment. Third vein united with costa before the apex of wing. Claws simple, strongly curved and as long as pulvilli.

About half a dozen species, most of which appear to be zoophagous, have been described so far. Two species, *ceylanica* and *obtusilobae*, were described by Felt (58) from Ceylon.

Genotype.—Dentifibula viburni (Felt).

Genus **Myricomyia** Kieff.

1900. *Myricomyia*, Kieffer, *Ann. Soc. Entomol. France*, LXIX, p. 470.
1913. *Myricomyia*, Kieffer, *Gen. Ins.*, fas. 152, p. 185.
1925. *Myricomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 157.

This small genus, with only two species, has not been previously recorded from India. It is distinguished from *Dentifibula* Felt by the absence of apical triangular process on the basal clasp segment. Terminal clasp segment is stout and twice as long as its diameter. Ventral plate is truncate or nearly so. One new species is described below.

Genotype.—Myricomyia longipalpis Kieff. (By original designation.)

Myricomyia pongamiae, sp. nov.

(Text-fig. 18.)

This new species attacks the shoot of *Pongamia glabra* Vent. and gives rise to large, woody galls on them.

Male.— 2 mm. long. Body dark brown. Antennae lost. Palpi triarticulate ; first segment short, sub-globose ; second segment stout and with a length twice its diameter ; third segment with a length about four times its diameter and basally as stout as the second and

apically reduced to an acutely pointed, cone-shaped tip ; both the second and third segments with numerous long setae. Claws as long as pulvilli and slightly curved in fore-legs and shorter than pulvilli and sharply bent in mid and hind legs. Basal clasp segment boat-shaped and with a length about twice its breadth in the middle. Terminal clasp segment somewhat longer than twice its diameter and somewhat bent at the strongly chitinised apex. Dorsal plate shorter than ventral plate and deeply bilobed, lobes broadly elliptic.

Female.— 2·5 mm. long. Body dark brown, densely hairy. Antennae half the length of body, segments 14 ; fifth segment with a stem one-third the length of enlargement, which latter has a length about thrice its diameter ; terminal segment with a length over twice its diameter and with a prolongation one-third the length of enlargement. Palpi triarticulate ; first segment with long setae ; second segment sub-globose ; third segment fusiform, with a length thrice its diameter, more slender than second and with a long slender setae apically. Mesonotum black, sub-median lines naked. Claws simple and a little longer than twice the length of empodium. Ovipositor retractile, one-fifth the length of body and sparsely clothed with long setae.

TEXT-FIG. 18.—*Myricomyia pongamiae*, sp. nov. Solid stem galls of *Pongamia glabra* Vent.

Holotype.— Male, partly dissected on slide. No. $\frac{996}{H\ 6}$.

Allo-co-types.— Three females on slide. No. $\frac{997}{H\ 6}$.

Paratypes.— Both females and males in spirit. No. $\frac{1030}{H\ 6}$.

Type-locality.— A scrub-jungle, near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 2.ii.1931.

Other localities.—Marina, Madras.

Galls.— The galls are local or extensive tumescence of branches, rachides and mid-ribs of leaves. They have not been described so far.

10-20 mm. in diameter. Regular, globose, pyriform, fusiform or irregular, extensive, moniliform, flexuose ; greenish-yellow or brownish-yellow, glabrous when young and tubercular and punctate when old ; solid, lignose, cystiferous and indehiscent. Cysts longitudinal. The epidermis surrounds a relatively large parenchymatous cortex of large cells. The cortex is separated from an inner medulla by the annular cystiferous zone, in which cysts and vascular bundles are arranged alternately. In older galls the medulla dries up leaving a large hollow space.

Life-history.— Eggs are laid on the tender shoots. The larvae hatching from them bore their way into the stem and, on reaching the vascular bundles, proceed either up or down. This occasions gall formation. The larval period is a long one and extends over two months. Pupation is in the galls just below the epidermis and takes about four or five days. There appear to be two generations in one year.

Sub-tribe *TRIFILA.*

Genus **Clinodiplosis** Kieff.

1894. *Clinodiplosis*, Kieffer, *Feuille Juenes Nat.*, XXIV, p. 121.
1896. *Clinodiplosis*, Kieffer, *Wein. Entomol. Zeit.*, XV, pp. 93, 96.
1911. *Clinodiplosis*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 54.
1913. *Clinodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 237.
1918. *Clinodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 202, pp. 177-179.
1920. *Clinodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 16.
1925. *Clinodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 162.
1928. *Clinodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 15.

This genus comprises about a dozen species. No adult form of this genus has as yet been described from India ; but Kieffer (105) described three species, *nodifex*, *artemisiarum* and *cellularis*, from larval forms only.

Palpi quadriarticulate. Antennal segments 14, circumfila regular and not greatly produced. Claws toothed on fore and mid legs and simple on hind legs. Basal clasp segment not bilobed and without a spine. Terminal clasp segment fusiform and not dilated. Ventral plate elongate and apically emarginate. Dorsal plate deeply bilobed and triangularly emarginate.

Genotype.—Clinodiplosis cilicrus Kieff. (By original designation.)

Genus **Oribremia** Kieff.

1913. *Oribremia*, Kieffer, *Rec. Ind. Mus.*, IX, p. 199.
1913. *Oribremia*, Kieffer, *Gen. Ins.*, fas. 152, p. 194.
1920. *Oribremia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 14.
1925. *Oribremia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 162.
1928. *Oribremia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 11.

This genus is distinguished from *Clinodiplosis* Kieff. by its apically rounded ventral plate and deeply and narrowly divided dorsal plate.

The only species of this genus, *multifida*, was described by Kieffer (1913) from midges taken in the Kumaon Hills, Western Himalayas. The type location could not be traced.

Genotype.—Oribremia multifida Kieff.

Genus **Mycodiplosis** Rubs.

1853. *Diplosis (partim)*, Winnertz, *Linn. Entomol. Stett.*, VIII, p. 267.
1895. *Mycodiplosis*, Rubsaamen, *Entomol. Nachr.*, XXI, p. 186.
1896. *Mycodiplosis*, Kieffer, *Wein. Entomol. Zeit.*, XV, pp. 92-95.
1897. *Mycodiplosis*, Kieffer, *Synop. Cecid. Europ. Algerie*, p. 28.
1908. *Mycodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 400.
1910. *Mycodiplosis*, Rubsaamen, *Zeit. Wissenschaft. Insektenbiol.*, XV, p. 289.
1911. *Mycodiplosis*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 54.
1913. *Mycodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 241.
1918. *Mycodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 202, p. 179.
1920. *Mycodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 16.
1925. *Mycodiplosis*, Felt., *Bull. N. Y. St. Mus.*, No. 257, p. 162.
1928. *Mycodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 16.

This genus comprises numerous small, light brown or yellowish midges, which breed on various fungi. The genus is recognised by the following characters: Palpi quadriarticulate; antennal segments 14, circumfila regular or nearly so, without greatly produced loops, middle circumfila of male not short; third vein united with costa beyond the apex of wing; claws unidentate on fore-legs and simple and slightly curved on mid and hind legs.

Genotype.—Mycodiplosis coniophaga (Winnertz). (By original designation.)

Mycodiplosis indica Felt.

1920. *Mycodiplosis indica*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 5.
1928. *Mycodiplosis indica*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 16.

This is a small, reddish or reddish-brown midge breeding on spores of the rust fungus, attacking cambu, *Pennisetum typhoideum* Gertn. The antennae are twice the length of body in male and nearly as long as body in female. Mesonotum is thickly clothed with yellowish hairs in male. I refer to this species numerous maggots found on leaves of *cambu* with rust disease on the Borstal Farm, Tanjore, South India.

Genus **Schizobremia** Felt.

1926. *Schizobremia*, Felt, *Entomol. Month. Mag., London*, LXII, p. 183.
1928. *Schizobremia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 16.

This genus appears to fall between *Mycodiplosis* Rubs. and *Diadiplosis* Felt. It resembles the former in its strongly curved, unidentate claws on fore and mid legs and simple claws on hind legs, but differs in its triarticulate palpi and third vein united with costa at the apex of wing. It resembles the latter in its triarticulate palpi but differs in its strongly bent claws and relatively longer ventral plate. Only two species, of which one is Indian, have been described so far.

As no genotype has so far been indicated, I designate *S. formosana* Felt as the type of the genus *Schizobremia* Felt.

Schizobremia malabarensis Felt.

1927. *Schizobremia malabarensis*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, X, pp. 1-2.

This is a small yellowish midge with the antennae about three-fourths the length of body. It breeds on the mealy bug, *Pseudococcus virgatus*, in South Malabar. Felt provisionally referred the midge to this genus.

Genus **Diadiplosis** Felt.

1911. *Diadiplosis*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 54.
1913. *Diadiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 240.
1918. *Diadiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 202, p. 204.
1920. *Diadiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 14.
1925. *Diadiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 162.
1928. *Diadiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 16.

This genus was erected by Felt for midges closely related to *Mycodiplosis* Rubs., but with triarticulate palpi. Claws are not sharply bent. Terminal clasp segment is not greatly produced. Ventral plate short and broad.

Of the two Indian species, *coccidivora* Felt, was described from Ceylon. The species, *indica* Felt, was taken at Pusa. It breeds on the scale-insects, *Phenococcus hirsutus* of Mulberry and *Pseudococcus corymbatus*.

The genotype is *D. cocci* Felt and not *D. coccidivora* Felt, as given by Senior-White.

Key to species.

I. Circumfila loops 8, stems of fifth antennal segments equal, abdomen yellow	*D. coccidivora* Felt.
II. Circumfila loops 10, stems of fifth antennal segments unequal, abdomen reddish-brown .	*D. indica* Felt.

Genus **Xiphodiplosis** Felt.

1915. *Xiphodiplosis*, Felt, *Journ. N. Y. Entomol. Soc.*, XXIII, p. 180.
1920. *Xiphodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 16.
1925. *Xiphodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 162.
1928. *Xiphodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 17.

This genus is related to *Diadiplosis* Felt, from which it is distinguished by its greatly produced terminal clasp segment being equal to the basal clasp segment. Ventral plate is longer than dorsal plate, moderately broad and rounded apically. Palpi triarticulate. The only species of this genus, *fulva*, is described by Felt from Ceylon.

Genotype.—Xiphodiplosis fulva Felt.

Genus **Arthrocnodax** Rubs.

1895. *Arthrocnodax*, Rubsaamen, *Wein. Entomol. Zeit.*, XIV, p. 189.
1896. *Arthrocnodax*, Kieffer, *Wein. Entomol. Zeit.*, XV, p. 92.
1897. *Arthrocnodax*, Kieffer, *Synop. Cecid. Europ. Algerie*, pp. 29.
1908. *Arthrocnodax*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 403.
1911. *Arthrocnodax*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 57.
1913. *Feltodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 154.
1913. *Arthrocnodax*, Kieffer, *Gen. Ins.*, fas. 152, p. 155.
1920. *Feltodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 12.
1925. *Arthrocnodax*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 163.
1928. *Arthrocnodax*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 8.

This genus comprises numerous small, yellowish midges, with a zoophagous habit. It is distinguished from *Xiphodiplosis* Felt by its simple claws on all legs. Palpi quadriarticulate. Antennal segments with lengths less than their diameters and with short circumfili. Third vein united with costa before the apex of wing. Pulvilli as long as claws. Felt believes *Feltodiplosis* Kieff. to be identical with *Arthrocnodax* Rubs. Two species, *ruthurfordi* and *walkeriana*, were described by Felt (36) from Ceylon.

Genotype.—Arthrocnodax vitis Rubs. (By original designation.)

Genus **Microdiplosis** Tav.

1908. *Microdiplosis*, Tavares, *Broteria*, VII, p. 155.
1913. *Microdiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 210.
1925. *Microdiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 163.

This genus, not previously recorded from India, comprises minute midges breeding in galls of Acarina. It is related to *Arthrocnodax* Rubs., which it resembles in its simple claws on all legs, quadriarticulate palpi and pulvilli equal to claws, but differs in the relatively longer stem of its flagellate antennal segments and relatively longer circumfila. Third vein united with costa near or at the apex of wing. Ventral plate slender, emarginate, apically enlarged and longer than dorsal plate. Kieffer (111) describes the pulvilli as rudimentary but I find them well developed, though short.

Genotype.—Microdiplosis zambensis Tav. (By original designation.)

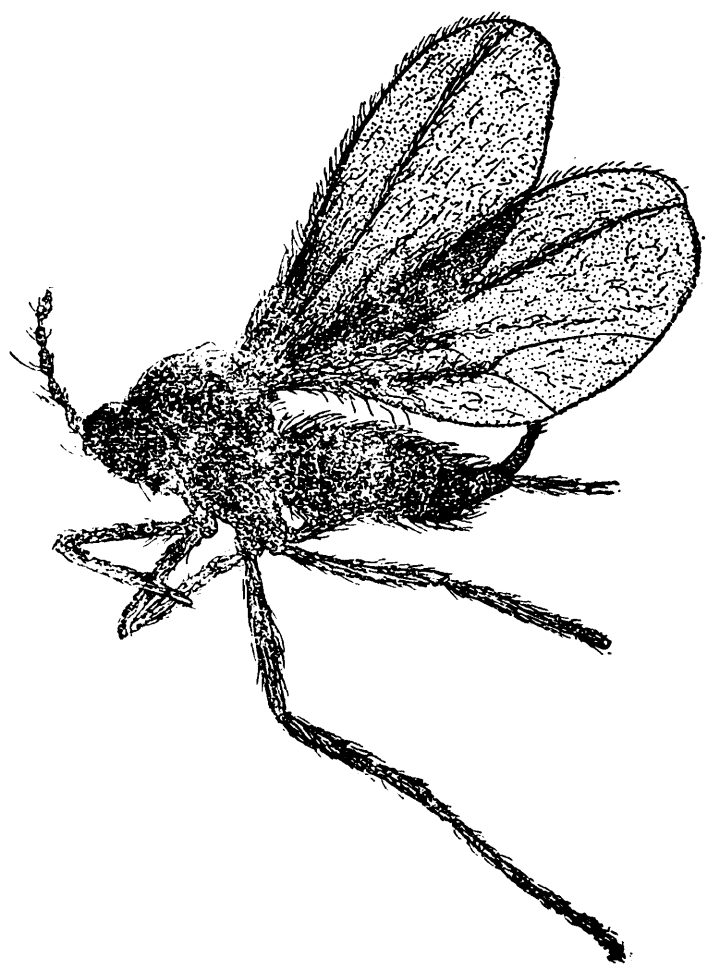
Microdiplosis pongamiae, sp. nov.

(Text-figs. 19 and 20.)

This species was bred from the polypoid galls on the leaflets of *Pongamia glabra* Vent. along with the mite, *Eriophyes cheriani* Massee. I refer to this species a series of midges bred by Annandale from the polypoid galls taken at Chilka Lake and now in the collection of the Zoological Survey, Indian Museum.

Male.— 1 mm. long. Body yellowish. Antennae one-fourth longer than body ; segments 14 ; first segment broadly obpyriform, deeply excavated apically, with a length three-fourth its diameter ; second segment irregularly sub-globose, with a length a little greater than its diameter ; third segment with the apical enlargement stouter than the basal, stems sub-equal ; fourth segment united with third and a little longer, basal stem with a length about one half the diameter of the basal enlargement, apical stem with a length over one half the diameter of the apical enlargement ; fifth segment sub-equal to third, apical enlargement lengthened out both basally and apically, stems sub-equal. Palpi quadriarticulate ; second segment short, globose ; third segment ovoid, one and half times as long as second and equally stout ; fourth segment twice the third. Mesonotum yellowish-brown. Claws simple on all legs, somewhat sickle-shaped, about as long as empodium. Basal clasp segment irregularly triangular, with a length about twice its breadth at the base. Terminal calsp segment swollen basally, slightly and

evenly curved distal portion with a length five times its diameter, minutely bidentate at apex.



Text-fig. 19.—*Microdiplosis pongamiae*, sp. nov. Female showing the head partially covered over by the thorax.

Female.— 0·75 mm. long. Body dirty yellowish-brown, thickly haired. Antennae three-fourths the length of body ; segments 14 ; second segment ovoid, with a length one half greater than its diameter ; third segment fused with the fourth, with a stem one-fifth the length of the cylindrical enlargement, which latter has a length two and half times its diameter ; fourth segment a little shorter than third and with a stem one-fourth the length of enlargement ; fifth segment a little shorter than fourth, with a stem one-half the length of the enlargement ; stems of other flagellate segments gradually increase in length ; stem of penultimate segment transparent, one-third the length of the enlargement. Palpi quadriarticulate ; first segment short, ovoid ; second and third segments sub-equal, each with a length about four times its diameter ; fourth segment a little shorter and more slender than third. Mouth parts somewhat prolonged. Thorax distinctly produced over the head. Mesonotum dark brown. Claws bent at right angles, with rudimentary pulvilli. Ovipositor long, partially retractile ; terminal lobes with a length three times the breadth.

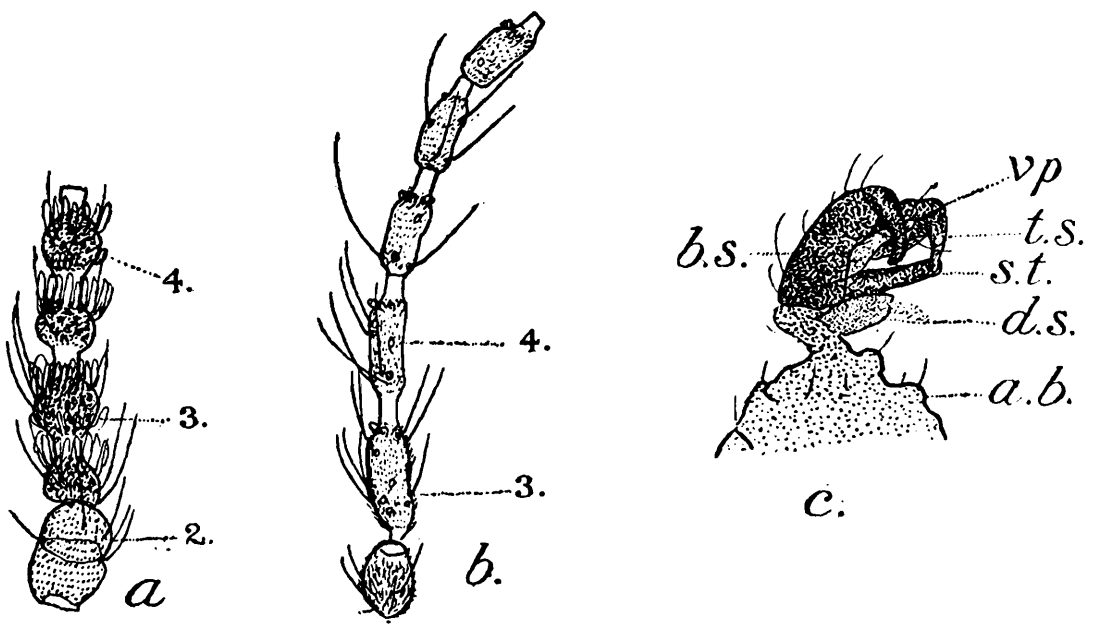
Holotype.— Male, in spirit. No. $\frac{998}{H\,6}$.

Allotype.— Female, on slide. No. $\frac{999}{H\,6}$.

Paratypes.— Both males and females, in spirit. No. $\frac{1000}{H\,6}$. On slides Nos. $\frac{1001}{H\,6}$ and $\frac{1031}{H\,6}$.

Homotypes.— (N. Annandale coll.) in spirit. No. $\frac{1002}{H\,6}$.

Type-locality.— A scrub-jungle near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 17.vii.1933.



TEXT-FIG. 20.—*Microdiplosis pongamiae*, sp. nov. *a.* antennal segments of male ; *b.* antennal segments of female ; *c.* male genitalia ; *a. b.* abdomen ; *b. s.* basal clasp segments ; *d. s.* dorsal segment ; *s. t.* style ; *t. s.* terminal segment ; *v. p.* ventral plate.

Other localities.— Coimbatore, Vellore, Madras, Chilka Lake Islands, and Calcutta.

Galls.— The polypoid galls were believed by Cherian to be produced by the mite, *Eriophyes cheriani* Massee. Further investigations (126), however, have shown that both this mite and the new species of midge described above are responsible for its formation. Neither of them alone produce such galls.

10 mm. long, 5 mm. thick. Regular, obovoid or obliquely obpyriform, polyp-like, hollow, pedicelled galls on the upper surface of the leaflets. Simple or compound, unilocular, acystiferous and indehiscent. Cavity communicates with the outside by a narrow passage through the pedicel. Greenish or dark-greenish, glabrous or rarely pubescent or tomentose on the outside and with numerous granulations and erineums on the inner side. Palisade and spongy parenchymae of leaflets completely degenerated into broad, horse-shoe shaped, undifferentiated parenchyma. There is an apparent increase of vascular bundles and fibrous tissues in the gall.

Life-history.—Not known in detail. Earlier stages not studied. Larvae live in company with the mites and feed on the plant tissues. Pupal period is variable with seasons, occupying only about three days in dry weather and more than a week in wet weather. There are apparently many generations in one year.

Genus **Cecidomyiella** Del Guer.

1918. *Cecidomyiella*, Del Guerico, *Bibl. Agr. Cologna*, p. 247.
1925. *Cecidomyiella*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 163.

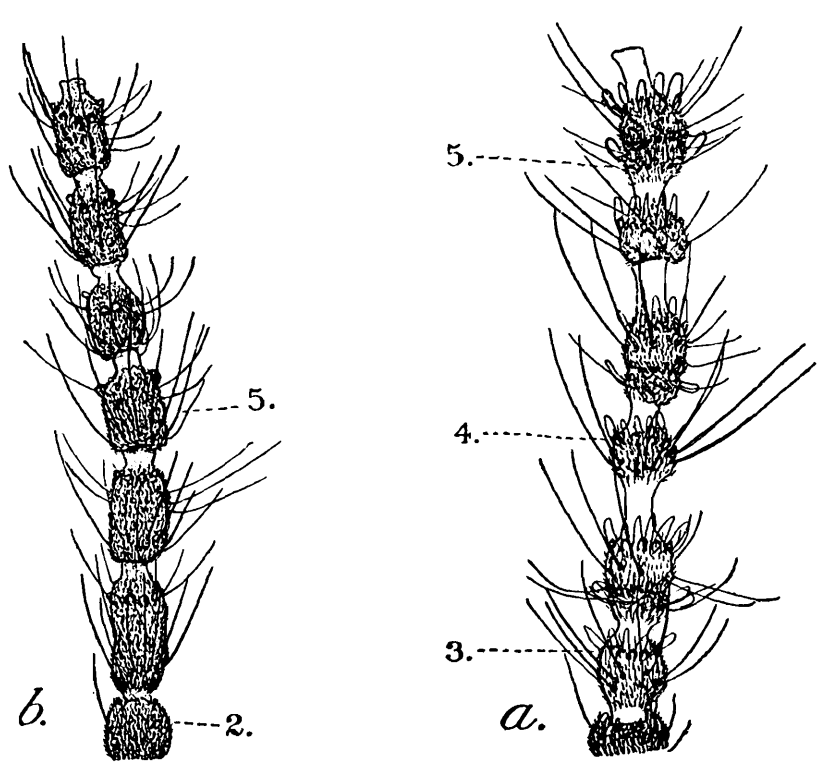
I am recording this genus for the first time from India. It is closely related to *Microdiplosis* Tav., from which it is distinguished by the relatively longer stems of its flagellate antennal segments. The lobes of the divided dorsal plate are long, triangular and shorter than ventral plate. The new species described below is referred to this genus.

Cecidomyiella crataevae, sp. nov.

(Text-figs. 21 and 22, plate VII, figs. 4 and 5.)

This new species produces leaf-bud galls on *Crataeva religiosa* Forst.

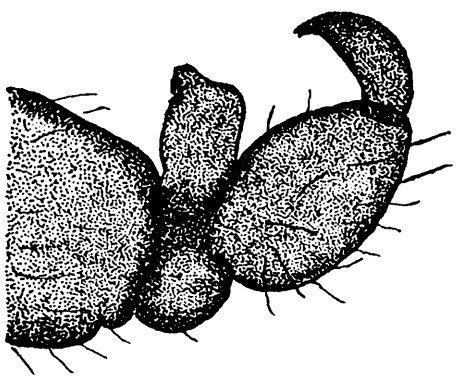
Male.— 1·25 mm. long. Body yellowish-brown. Antennae a little longer than body, segments 14 ; third segment fused with the fourth, stems one-fourth and three-fourths the length of basal and apical enlargements respectively, apical enlargement somewhat constricted about its basal fourth ; fourth segment with stems one-third and three-fifths the enlargements, basal enlargement sub-globose, apical enlargement sub-cylindrical, slightly constricted in the middle, with a length over one half greater than its diameter ; ninth segment with stems equal to and three-fourths the enlargements ; terminal segment with a stem a little longer than basal sub-globose enlargement, apical enlargement



Text-fig. 21.—*Cecidomyiella crataevae*, sp. nov. *a*. antennal segments of male ; *b*. antennal segments of female.

distinctly swollen in the middle. Palpi quadriarticulate ; first segment very short, stout ; second segment stout, cylindrical and with a length twice its diameter ; third segment one-half longer and more slender than second ; fourth segment sub-equal to third and sparsely setose.

Mesonotum brown. Claws simple and as long as pulvilli. Basal clasp segment broadly and roundly triangular, with a length a little less than twice the breadth and sparsely setose. Terminal clasp segment short, stout, slightly curved, strongly chitinised and bidentate apically. Dorsal plate with a rounded apex, emarginate and longer than the ventral plate.



TEXT-FIG. 22.—*Cecidomyiella crataevae*, sp. nov. Male genitalia.

Female.— 1 mm. long. Body bright orange. Antennae as long as body, segments 14, with a basal whorl of long and an apical whorl of shorter setae ; third segment with a stem one-seventh the length of the cylindrical enlargement, which latter has a length twice its diameter ; fifth segment with a stem about one-fourth the length of enlargement, which latter has a length one-fourth greater than its diameter ; terminal segment with a length four times its diameter and somewhat reduced towards the apex. Palpi quadriarticulate ; first and second segments short and slender ; third segment a little longer and stouter ; fourth segment very stout and much longer than the rest, sparsely covered with short setae. Pulvilli longer than claws in fore-legs and as long as claws in hind legs. Ovipositor half the length of body.

Cotypes.— Males and females, partly dissected on slides. Nos. $\frac{1003}{H\ 6}$ and $\frac{1032}{H\ 6}$.

Paratypes.— Males and females in spirit. No. $\frac{1033}{H\ 6}$.

Type-locality.— A scrub-jungle near Tanjore, Madras Presidency, South India. Coll. M. S. Mani, 7.vii.1933.

Other localities.— Medical College Grounds, Madras.

Galls.— The galls are homologically leaf buds, leaflets or out-growths from the cortex of the shoot.

5-15 mm. in diameter. Irregular, globose or pyriform, local or extensive, free or compound ; lobed, solid, fleshy, succulent, tubercular, yellowish-green or yellowish-white on the surface and greenish within, with narrow irregular spaces. When cut, the gall presents the appearance of a ruminated endospermous seed. Larvae are found in the spaces between the lobes. The substance consists entirely of simple parenchyma with all the veins intact and scattered in the parenchyma. Centres of cell proliferation are parenchyma of leaves and cortex of young stems.

Life-history.— Eggs are laid on the tender leaf buds and maggots hatch out on the second or the third day. They attack the developing

buds and thus occasion the formation of galls. Larval period is about two weeks, at the end of which the scarlet-red maggots creep out of the gall and wander on the surface of the plant for a time and finally drop to the ground. They burrow into the soil to a depth of about one to two inches, where they pupate in small oval, silken-lined chambers. At this time they appear to be very sensitive to light, as any exposure retards their development. Pupal period takes about three days, at the end of which the adults escape from the soil. There are several generations in the year.

Genus **Chrysodiplosis** Kieff.

1911. *Chrysodiplosis*, Kieffer, *Trans. Linn. Soc., London*, XIV, p. 318.
1913. *Chrysodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 145.
1920. *Chrysodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 12.
1925. *Chrysodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 163.
1928. *Chrysodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 7.

This genus is recognised by its quadriarticulate palpi, finely denticulate antennal hairs and dense yellowish hairs on the thorax. Wings rather densely brown-haired, with clear spots, costa scaled black, third vein united with costa before the apex of wing. Claws simple on all legs.

Genotype.—Chrysodiplosis pulchericornis Kieff.

Chrysodiplosis squamatipes Kieff.

1912. *Chrysodiplosis squamatipes*, Kieffer, *Spol. Zeyl.*, VIII, p. 28.
1920. *Chrysodiplosis squamatipes*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 12.

I refer to this species one badly damaged midge in the Indian Museum collection bearing the label : Peradeniya, Ceylon. It is presumably one of the paratypes mentioned by Brunetti.

Genus **Plutodiplosis** Kieff.

1912. *Plutodiplosis*, Kieffer, *Spol. Zeyl.*, VIII, p. 27.
1913. *Plutodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 166.
1920. *Plutodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 12.
1925. *Plutodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 164.
1928. *Plutodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 9.

This small genus is distinguished from *Chrysodiplosis* Kieff. by its third vein united with costa beyond the apex of wing and by its one or more produced loops of circumfila. Palpi quadriarticulate. Wings yellow with black spots. Legs thickly scaled and spotted. Pulvilli as long as claws. The only species of this genus, *magnifica*, was described by Kieffer (109) from Ceylon.

Genotype.—Plutodiplosis magnifica Kieff. (By original designation.)

Genus **Raodiplosis** Felt.

1920. *Raodiplosis*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 6.
1925. *Raodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 165.
1928. *Raodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 14.

This genus was erected by Felt for midges bred by A. G. Rao from Mango in Thaton, Burma. It is related to *Caryomiya* Felt and *Macrodiplosis* Kieff., but differs in its very narrow wings, having a length four

times its breadth, in the relatively longer stem of its flagellate segments and in its ovipositor having a length one-third that of the abdomen. Only one species, *orientalis*, has been described so far.

Genotype.—Raodiplosis orientalis Felt. (By original designation.)

Genus **Androdiplosis** Felt.

1915. *Androdiplosis*, Felt, *Journ. N. Y. Entomol. Soc.*, XXIII, p. 182.
1920. *Androdiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 16.
1925. *Androdiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 165.
1928. *Androdiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 15.

Basal flagellate antennal segments of female plainly binodose. Pulvilli as long as claws. Ovipositor short and without a conspicuous process on the lobes.

The only species of this genus, *coccidivora*, was described by Felt from Ceylon, and the description is based on a female specimen.

Genus **Diplecus** Kieff.

1912. *Coprodiplosis* (*partim*), Kieffer, *Spol. Zeyl.*, VIII, p. 29.
1913. *Diplecus*, Kieffer, *Bull. Nat. Hist. Soc. Metz*, XXVII, p. 55.
1913. *Diplecus*, Kieffer, *Gen. Ins.*, fas. 152, p. 201.
1920. *Diplecus*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 14.
1925. *Diplecus*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 165.
1928. *Diplecus*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 11.

This genus is distinguished from *Androdiplosis* Felt by its rudimentary pulvilli. The type in the Indian Museum is badly damaged.

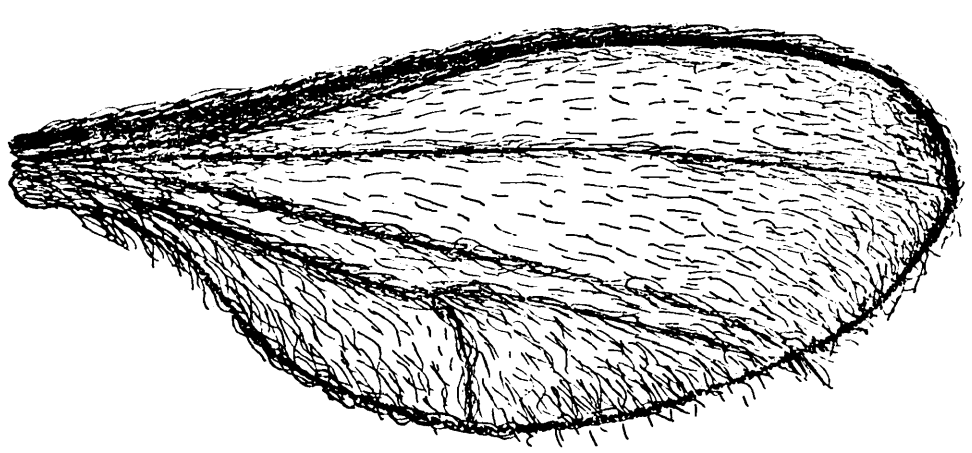
Genotype.—Diplecus inconspicuus (Kieff.). (By original designation.)

Diplecus inconspicuus (Kieff.).

(Text-fig. 23.)

1912. *Coprodiplosis inconspicuus*, Kieffer, *Spol. Zeyl.*, VIII, p. 29.
1913. *Diplecus inconspicuus*, Kieffer, *Bull. Nat. Hist. Metz*, XXVII, p. 55.

This is a small reddish coloured species described from Ceylon. Fragments of a single midge, apparently a paratype, were found with



TEXT-FIG. 23.—*Diplecus inconspicuus* (Kieff.). Wing of male.

the label: *Coprodiplosis inconspicuus* Kieff., Peradeniya, Ceylon, Ind. Museum. In order to prevent its further deterioration, I have mounted

it in Canada balsam (Slide No. $\frac{1004}{H\ 6}$). Female 1 mm. long. Claws short and without a distinct empodium.

Genus **Orseoliella** Kieff.

1909. *Orseolia (partim)*, Kieffer and Massalongo, *Marcellia*, VIII, p. 125.
1912. *Orseoliella*, Kieffer, *Marcellia*, XI, p. 231.
1913. *Orseoliella*, Kieffer, *Gen. Ins.*, fas. 152, p. 152.
1920. *Orseoliella*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 15.
1925. *Orseoliella*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 167.
1928. *Orseoliella*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 7.

This genus is distinguished from *Orseolia* Kieff. and Mass., to which it is related, by its quadriarticulate palpi and five loops of circumfila on the flagellate antennal segments of female. Third vein united with costa beyond the apex of wing. Claws simple on all legs and not sharply bent at right angles. Pulvilli a little longer than claws. Basal clasp segment lobed, lobes basal and obtuse. Ventral plate long, broad and broadly rounded apically.

Genotype.—Orseoliella javanica (Kieff.). (By original designation.)

Key to species.

I. Antennae three-fourths the length of body, pulvilli a little longer than claws — *O. apludae* Felt.

II. Antennae as long as body, pulvilli as long as claws — *O. graminis* Felt.

Orseoliella apludae Felt.

1920. *Orseoliella apludae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 8.

This is a large midge which breeds in galls of the grass, *Apluda varia* Hack. Mesonotum reddish-brown in both sexes. Abdomen yellowish in male and reddish-brown in female.

Orseoliella graminis Felt.

1921. *Orseoliella graminis*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 22.

This is a slightly larger species than the above. It gives rise to galls on *Andropogon squarosus* Linn.

Genus **Lestodiplosis** Kieff.

1884. *Lestodiplosis*, Kieffer, *Bull. Soc. Entomol. France*, LXIII, p. 280.
1894. *Coprodiplosis*, Kieffer, *Fuelle Jeunes Nat.*, XXIV, p. 84.
1894. *Hemidiplosis*, Kieffer, *Ann. Sc. Nat.*, I, p. 9.
1908. *Lestodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 407.
1910. *Lestodiplosis*, Rubsaamen, *Zeit. Wissen. Insektenbiol.*, XV, p. 285.
1911. *Lestodiplosis*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, pp. 59-60.
1913. *Lestodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 195.
1920. *Lestodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 14.
1925. *Lestodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 167.
1928. *Lestodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 11.

This genus comprises numerous small to medium-sized, yellowish or brownish, zoophagous midges. They feed on the larvae of other

Itonids, Mycetophilids, Xylophagids, etc. A number of species are also inquilines in different midge galls.

The genus is recognised by the triangular lobe at the base of the slender basal clasp segment. Dorsal plate short, deeply and triangularly emarginate, lobes narrow, parallel and broadly rounded. From the typical *Lestodiplosis* Kieff. the sub-genus *Coprodiplosis* Kieff. is separated by its hyaline wings, which, however, is not a reliable character.

One species of this genus,, *ceylanicus*, was described by Kieffer (109) from Ceylon.

Genotype.—Lestodiplosis alternans Kieff. (By original designation.)

Genus **Pachydiplosis** Kieff.

1913. *Pachydiplosis*, Kieffer, *Bull. Nat. Hist. Soc. Metz.*, XXVIII, p. 108.
1913. *Pachydiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 224.
1920. *Pachydiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 15.
1925. *Pachydiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 169.
1928. *Pachydiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 14.

Felt (76) places this genus between *Plemeliella* Sitn. and *Itonida* Meig. in the series with dorsal plate not incised. I find, however, that this genus more closely approaches *Styracodiplosis* Tav. (172) in its deeply and roundly incised dorsal plate, with broadly rounded lobes and in its moderately short, stout, terminal clasp segment but differs in the same not being dentate or serrate. The genus would thus be more correctly placed with *Styracodiplosis* Tav.

Pachydiplosis is distinguished from *Lestodiplosis* Kieff. by its unspotted wings and basal clasp segment not conspicuously lobed. It is distinguished from *Itonida* Meig. by its relatively shorter terminal clasp segment, longer conical ovipositor and by the dorsal plate.

About half a dozen species, most of them previously referred to *Clinodiplosis* Kieff., have been described so far. Kieffer described two Indian species.

Genotype.—Pachydiplosis apricanus Kieff. (By original designation.)

Partial key to species.

I. Pulvilli shorter than claws	*P. oryzae* (Wood-Mason) Mani.
II. Pulvilli as long as claws	*P. ceylanicus* (Kieff.).

Pachydiplosis oryzae (Wood-Mason) Mani.

(Text-figs. 24, 25 and 26.)

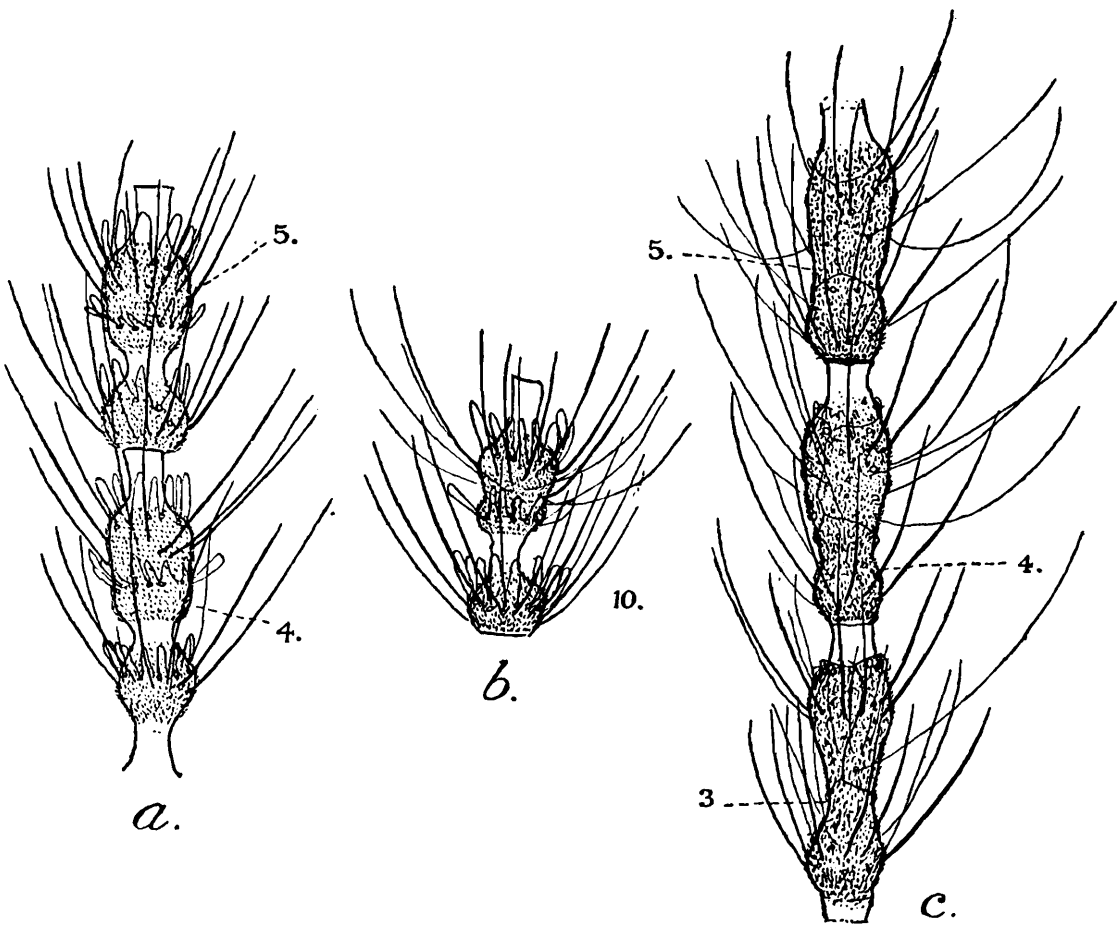
1881. *Cecidomyia oryzae*, Wood-Mason in Riley, *Amer. Naturalist*, p. 149.
1890. *Cecidomyia oryzae*, Cotes, *Ind. Mus. Notes*, I, p. 103.
1921. *Pachydiplosis oryzae*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 16.
1928. *Pachydiplosis oryzae*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 14.

This midge was first observed on paddy by Wood-Mason (187), who proposed for it the name *Cecidomyia oryzae*, but published no description. Subsequently Felt (72) identified the midge bred from the "silver-shoot" galls of paddy at Coimbatore as belonging to the genus *Pachydiplosis* Kieff. and assuming that it was identical with Wood-Mason's *Cecidomyia oryzae*, called it *Pachydiplosis oryzae* (Wood-Mason),—but

did not publish any description. I describe the midge below, and have retained the name in view of the fact that it is well-known to workers on this group.

The following description is based on midges in Ramachandra Rao's collection, kindly placed at my disposal by Dr. T. V. Ramakrishna Ayyar, Government Entomologist, Agricultural College and Research Institute, Coimbatore.

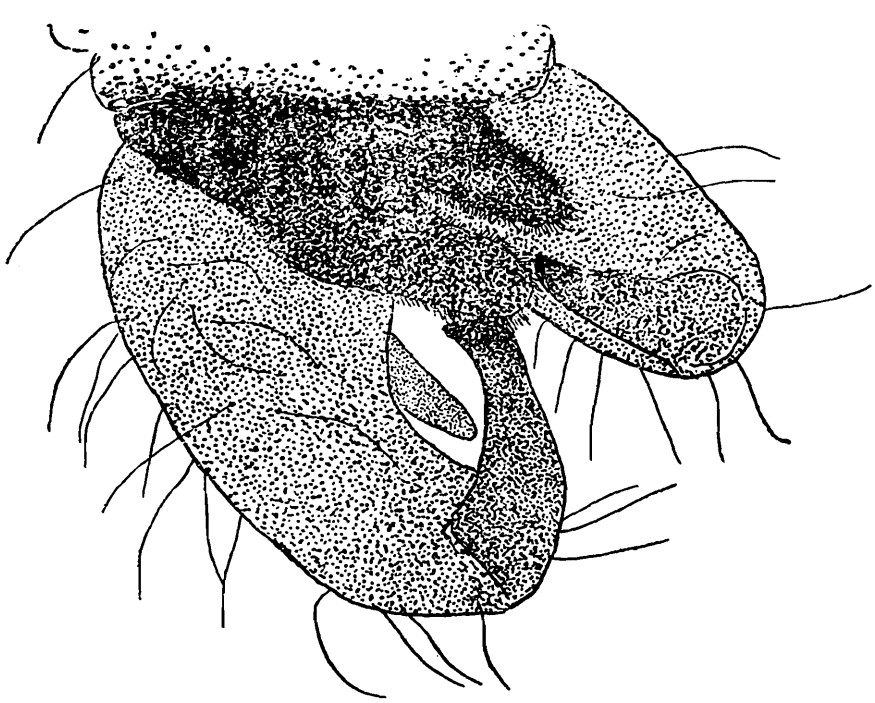
Male.— 3 mm. long. Body yellowish-brown, sparsely haired. Antennae dark reddish-brown, thickly haired, nearly equal in length to the body, segments 14 ; third segment with stems one-fifth and one-half the lengths of the basal and apical enlargements, basal enlargement broadly ovoid, with a length nearly equal to its diameter, apical enlargement sub-globose, with a length about twice its diameter ; fourth segment fused with third, sub-equal, stems one-fifth and one-half the basal globose and apical sub-cylindrical enlargements ; fifth segment a little shorter than fourth, stems two-thirds and one-half the basal and apical enlargements ; tenth segment with a basal stem three-fourths the length of basal globose enlargement and with an apical stem two-thirds the length of the apical sub-cylindrical enlargement, which latter is conspicuously constricted at its basal one-third ; penultimate segment with a basal stem sub-equal to the basal globose enlargement and an apical



TEXT-FIG. 24.—*Pachydiplosis oryzae* (Wood-Mason) Mani. *a.b.* antennal segments of male ; *c.* antennal segments of female.

stem one-half the length of apical enlargement, which latter is distinctly stouter apically than basally and has a length about twice its diameter ;

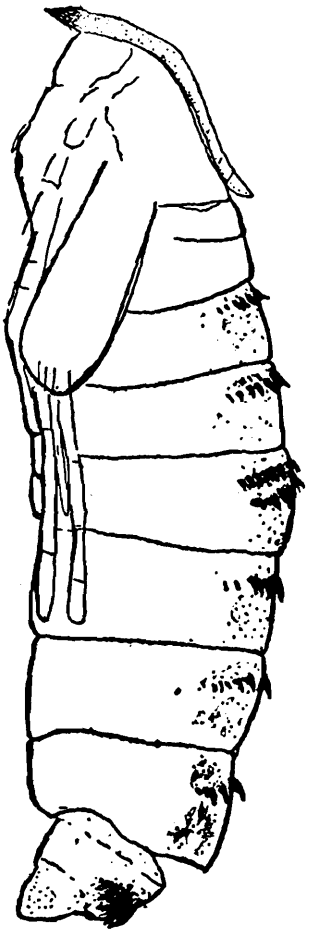
terminal segment sub-cylindrical, with a length twice its diameter and with a prolongation a little less than half its length. Palpi quadriarticulate, short, sparsely setose ; first segment short, stout, broader than long ; second segment nearly as long as first but more slender ; third segment a little longer and more slender than second ; fourth segment nearly equal to third, somewhat stouter and less setose, tip broadly and evenly rounded. Mesonotum brown, sub-median lines sparsely haired. Scutellum dirty yellowish-brown, post-scutellum darker. Halteres, stem light yellowish, head greyish-brown. Legs densely hairy and dark brown. Claws simple on all legs, evenly and slightly curved. Pulvilli half the length of claws. Abdomen brownish-yellow, sparsely setose. Genitalia pale brown, somewhat thickly setose ; basal clasp segment with a breadth at the base half the length and a breadth at the apex one-fourth the length, swollen basally and moderately setose ; terminal clasp segment about half the length of the basal clasp segment, rather thickly swollen at the base, somewhat curved beyond the basal half, sparsely setose and strongly chitinised apically ; dorsal plate deeply and broadly bilobed, lobes reddish-brown, thickly and shortly setose, with a length twice the breadth, evenly and broadly rounded apically.



TEXT-FIG. 25.—*Pachydiplosis* (Wood-Mason) Mani. Male genitalia.

Female.— 3·5 mm. long. Body bright reddish-brown, thickly haired. Antennae dark brown, moderately thickly haired, about half the length of body, segments 14 ; third segment with a stem one-ninth the sub-cylindrical, distinctly binodose enlargement ; fourth segment about three-fourth the length of third, with which it is fused, stem one-sixth the length of enlargement, which latter is constricted at its basal one-fourth ; fifth segment nearly equal to fourth, stem about one-quarter the length of enlargement ; ninth segment with a stem about one-third the length of the cylindrical enlargement, which latter has a length

about two and half times its diameter. Palpi quadriarticulate, sparsely setose ; first segment short, stout ; second segment with a length four times its diameter ; third nearly equal to second ; fourth stouter and a little longer than third, broadly and evenly rounded apically. Mesonotum dull reddish-brown at the sides and brownish-black between the sub-median lines, which are thickly haired. Scutellum reddish-brown, post-scutellum dark reddish-brown. Legs brownish and sparsely setose. Claws simple on all legs, diverging and somewhat curved at very tip only. Pulvilli half the length of claws but project beyond them. Abdomen bright reddish-brown in fresh and dark reddish-brown in older specimens, moderately setose. Ovipositor short, conical, terminal lobes of lamellae with a length two and half times its greatest width, sparsely setose.



Text-fig. 26.—*Pachydiplosis* (Wood-Mason) Mani. Exuvium of female showing a transverse row of spines on the dorsum of the abdomen.

Exuvium of female.— 5 mm. long. Antennal horns (cephalic horns) strongly chitinised and acutely pointed but not serrate anteriorly. Wing cases touch the posterior margin of the second abdominal segment. Hind legs reach but do not touch the posterior margin of the fifth abdominal segment. Dorsum of abdomen with transverse rows of stout, short, posteriorly recurved, strongly chitinised spines near the anterior margin. Dorsum of first segment without spines ; second segment with an anterior rudimentary and a posterior well-developed row ;

third segment with two well-developed rows of alternating spines ; rest of the segments up to the last but one similar ; the penultimate segment with spines longer, more slender and more acutely curved than on all the other segments. Spines on the sides of the segment shorter than those on the middle.

Holotype.— Male, partly dissected on slide. No. $\frac{1005}{H\ 6}$

Allotype.— Female, partly dissected on slide. No. $\frac{1006}{H\ 6}$

Paratypes.— One male and one female on pins. Nos. $\frac{1007}{H\ 6}$ and $\frac{1008}{H\ 6}$

Type-locality.— Coimbatore, Madras Presidency, South India, Coll. Y. R. Rao, 28.vii-9.viii. 1916.

Remarks.— This midge gives rise to long, tusk-shaped, white or pale brown, hollow galls on the shoot of the paddy plant and prevents the formation of the earheads ; it is the cause of the disease popularly called *anakomban.* The damage is often very extensive. It occurs almost throughout South India and to some extent in Bengal. The Proctotrypid parasite, *Platygaster oryzae* Cam. (Hymenoptera) sometimes effectively checks the spread of this pest, but no really effective control measure is known. The grass *Ophiurus corymbosus* is supposed to be an alternative food plant for this midge. Cotes (16) records that Wood-Mason believed this midge to be ovoviviparous.

Pachydiplosis ceylanicus (Kieff.).

1902. *Clinodiplosis ceylanicus*, Kieffer, *Spol. Zeyl.*, VIII, pp. 26-27, fig. 3.
1913. *Pachydiplosis ceylanicus*, Kieffer, *Gen. Ins.*, fas. 152, p. 224.
1928. *Pachydiplosis ceylanicus*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 14.

This is a somewhat smaller species of brownish-red colour. It was described by Kieffer from Ceylon. The type is lost. Five very badly damaged females, apparently paratypes, were found in the Indian Museum with the label : *Clinodiplosis ceylanicus* Kieff., Peradeniya, Ceylon, 3-x-10. To prevent further deterioration, I have mounted them in Canada balsam (Slide No. $\frac{1009}{H\ 6}$).

According to Kieffer, this species is related *P. graminicola* (Kieff.), which has been recorded from South India and Ceylon.

Genus **Itonida** Meig.

1800. *Itonida*, Meigon, *Nouvelle Classification*, p. 19.
1803. *Cecidomyia*, Meigen, *Illeger's Magazine*, II, p. 261.
1850. *Diplosis*, Herman Loew, *Dipt. Beitr.*, IV, p. 20.
1862. *Diplosis*, Osten Sacken, *Mon. N. American Dipt.*, I, p. 76.
1895. *Cryptodiplosis*, Kieffer, *Bull. Soc. Entomol. France*, LXIV, p. 194.
1897. *Diplosis*, Kieffer, *Synop. Cecid. Europ. Algerie*, p. 41.
1908. *Cecidomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 412.
1908. *Itonida*, Hendel, *Verhandl. zool-bot. Ges. Wein.*, LVIII, p. 49.
1910. *Cecidomyia*, Rubsaamen, *Zeit. Wiss. Insekt.*, XV, p. 286.
1911. *Itonida*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 61.
1913. *Cecidomyia*, Kieffer, *Gen. Ins.*, fas. 152, p. 211.
1913. *Itonida*, Kieffer, *Gen. Ins.*, fas. 152, p. 258.
1920. *Cecidomyia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 15.
1921. *Itonida*, Felt, *Bull. N. Y. St. Mus.*, Nos. 231, 232, pp. 175-208.
1925. *Itonida*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 169.
1928. *Cecidomyia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 13.
1928. *Itonida*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 17.

This is the oldest genus of the family and was erected by Meigen in 1800. At first it included all the other genera now referred to the

family. As at present recognised, it comprises over fifty two species, most of which are American. It is believed that the midges of this genus breed in leafy tissues. Two species have been described so far from India.

This genus is related to *Pachydiplosis* Kieff. but is distinguished by its terminal clasp segment equal to basal clasp segment and by its relatively longer, lobed ovipositor. Felt (73a) summarises the characters of this genus as follows : Palpi quadriarticulate ; antennal segments 14, flagellate antennal segments of male binodose, nodes distinctly unequal, circumfila well developed ; sub-costa united with costa before the basal third ; third vein united with the margin of wing well beyond the apex, fifth vein united with posterior margin of wing at the basal third, costa interrupted behind its union with the third vein ; claws simple on all legs and shorter than pulvilli ; dorsal and ventral plates rather deeply bilobed ; ovipositor long and stout, with long, narrowly oval terminal lobes, distinctly contracted basally.

Genotype.—Itonida pini (De Geer).

Key to species.

I. Antennae as long as body in female and one half longer than body in male, fifth antennal segment of female with stem three-fourths the length of enlargement . . . . . *I. penniseti* Felt.

II. Antennae shorter than body in female and as long as body in male, fifth antennal segment of female with stem one-third the length of enlargement . . . . . *I. seminis* Felt.

Itonida penniseti Felt.

1920. *Itonida penniseti*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 9.

This is a medium-sized midge attacking the grasses *Pennisetum cenchroides* Rich. and *P. alopecuros* Steud. Male abdomen yellowish, first segment reddish-brown. Female abdomen brown. I refer to this species numerous midges found breeding in *P. cenchroides* Rich. at Tanjore.

Itonida seminis Felt.

1921. *Itonida seminis*, Felt, *Mem. Dept. Agric. Ind., Entomol Ser.*, VII, p. 26.

This species attacks the ear-heads of *Pennisetum typhoideum* Gertn. (*cambu*). The female of this species is somewhat larger than that of the preceding species. The abdomen is orange coloured. This species is likely to prove a serious pest under favourable conditions.

Genus **Xylodiplosis** Kieff.

1853. *Diplosis* (*partim*), Winnertz, *Linn. Entomol. Stett.*, VIII, p. 276.
1895. *Xylodiplosis*, Kieffer, *Bull. Soc. Entomol., France*, LXIV, p. 193.
1913. *Xylodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 226.
1925. *Xylodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 169.

I am recording this genus here for the first time from India. It is referable to the tribe Porricondylariae but is provisionally placed in the Itonididinariæ by Felt. Kieffer based the description of the genotype on the male only, the female being unknown. I have come

across both sexes of another new species of this genus from Castle Rock, which I describe below under the name *X. kempi.*

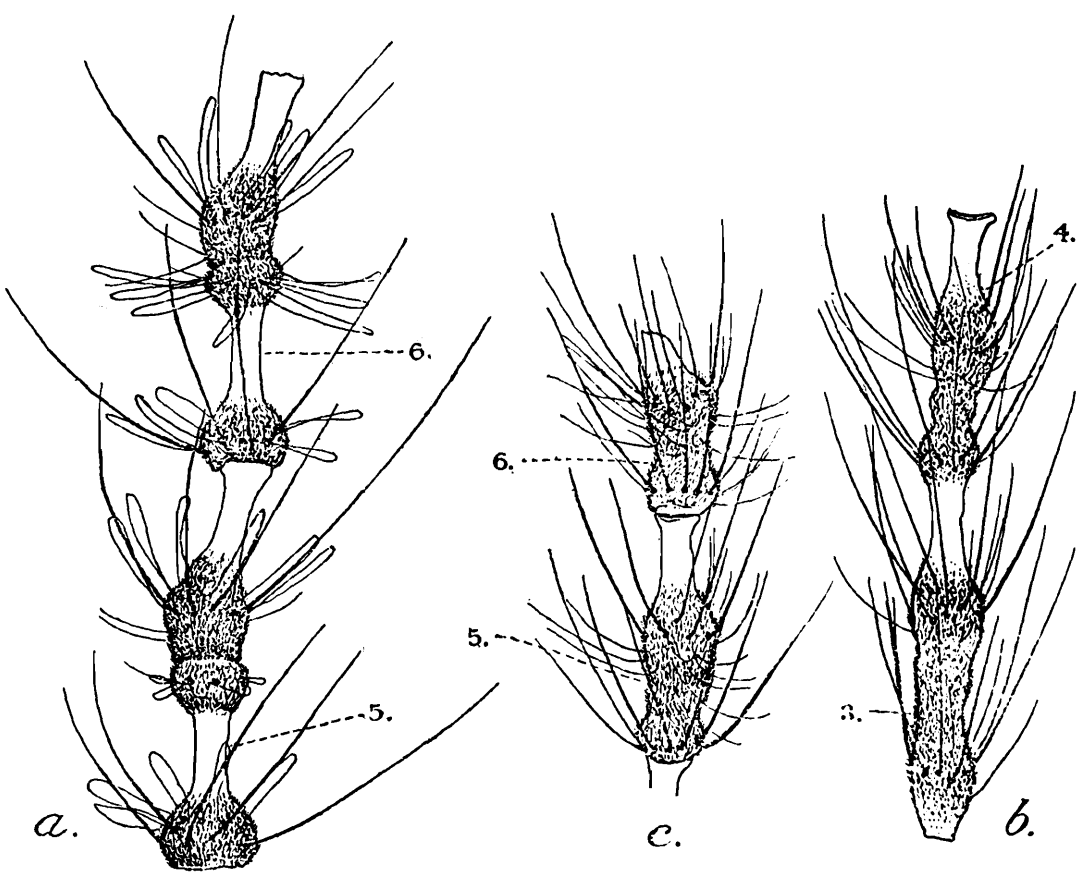
Palpi quadriarticulate. Antennal segments 14, binodose, stems unequal ; circumfila well developed, regular, loops as long as or longer than enlargements. Claws simple on all legs, twice the length of pulvilli. Cross-vein present but not well developed. Ovipositor very long, sometimes longer than body. Dorsal plate of male genitalia short, triangular and heavily chitinised ; basal clasp segment long and oval ; terminal clasp segment short, triangular, curved and broad basally.

Genotype.—Xylodiplosis praecox (Winn.). (By original designation.)

Xylodiplosis kempi, sp. nov.

(Text-figs. 27 and 28.)

Male.— Badly mutilated. Body dark brown, densely hairy. Fourth antennal segment (?) with stems equal to and three-fourths the lengths of enlargements, basal enlargement globose, apical enlargement subcylindrical, with a length about twice its diameter and constricted in the middle ; fifth antennal segment with stems one half greater than and equal to enlargements, apical enlargement constricted at its basal



TEXT-FIG. 27.—*Xylodiplosis kempi,* sp. nov. *a.* antennal segments of male ; *b.c.* antennal segments of female.

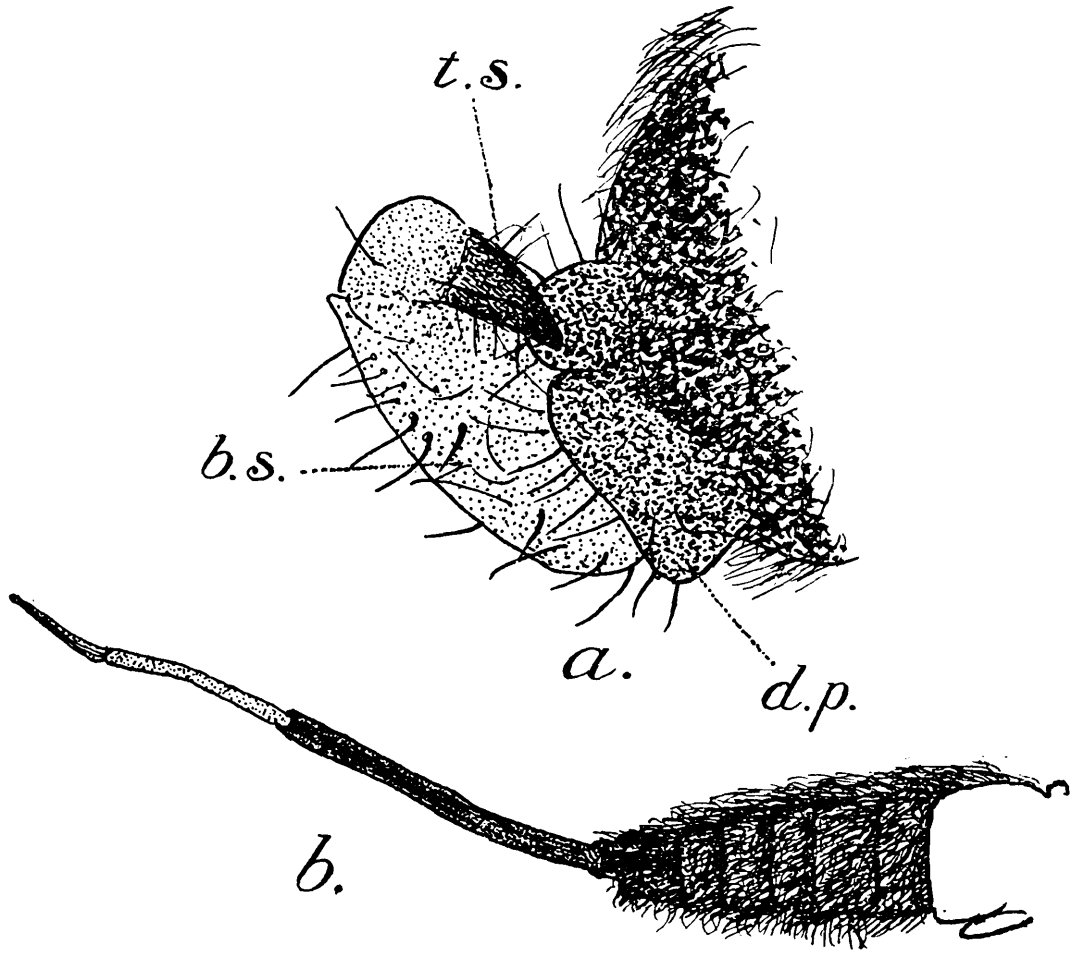
fourth. Genitalia yellowish-brown ; basal clasp segment long, oval and setose ; terminal clasp segment short, triangular, curved, broad

basally, somewhat chitinised and sparsely setose ; dorsal plate short, triangular and heavily chitinised.

wemale.— 2 mm. long. Body reddish-brown, densely hairy. Terminal part of antennae broken. Third segment with a stem a little less than one-third the length of enlargement, which latter is thickened both basally and apically ; fourth segment united with third, stem about half the length of enlargement, which latter has a basal globose thickening and an apical fusiform thickening, the constriction in the middle being narrower than that in the third segment ; fifth segment a little shorter than fourth, with a stem three-fourths the length of enlargement, which latter has a globose basal and an obpyriform apical swelling. Mesonotum brown. Scutellum yellowish-brown. Abdomen dark reddish-brown. Pulvilli about half the length of claws. Ovipositor reddish in colour and longer than body.

Holotype.— Female, on slide. No. $\frac{1010}{H\,6}$.

Allotype.— Male, badly mutilated and partly dissected, on the same slide as the holotype. No. $\frac{1011}{H\,6}$



TEXT-FIG. 28.—*Xylodiplosis kempi*, sp. nov. *a.* male genitalia ; *d.p.* dorsal plate, *v.p.* ventral plate, *t.s.* terminal clasp segment, *b.s.* basal clasp segment ; *b.* female genitalia showing the long ovipositor, part of which is still inside the abdomen.

Type-locality.— Castle Rock, North Kanara District, Bombay Presidency. Coll. S. Kemp, 11-26.x.1916.

Genus **Hormomyia** H. Loew.

1818. *Cecidomyia (partim)*, Meigen, *Syst. Beschr.*, I, p. 94.
1850. *Hormomyia*, Herman Loew, *Dipt. Beitr.*, IV, pp. 20, 31.
1861. *Angelinia*, Rondani, *Atti Soc. Ital. Sc. Milano.*, II, p. 290.
1908. *Hormomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 124, p. 387.
1911. *Hormomyia*, Felt, *Journ. N. Y. Entomol. Soc.*, XIX, p. 57.
1913. *Hormomyia*, Kieffer, *Gen. Ins.*, fas. 152, p. 137.
1920. *Hormomyia*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 271.
1921. *Hormomyia*, Felt, *Bull. N. Y. St. Mus.*, Nos. 231-232, p. 209.
1925. *Hormomyia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 170.
1928. *Hormomyia*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 6.

Prior to 1921 there was great confusion regarding the diagnosis and type of this genus. After an examination of all the available literature, Felt designated *Cecidomyia crassipes* Meig. as the type. He summarises the characters of this genus as follows :

Palpi tri-, bi-, or sometimes uniarticulate. Antennal segments 15-27 in male and 14 or more in female, flagellate segments of female strongly constricted. Wings generally long and narrow, third vein united with the costa at or beyond the apex. Mesonotum greatly produced over the head. Claws stout, long, evenly curved and generally simple. Pulvilli often reduced in male. Basal clasp segment stout. Terminal clasp segment obtuse and with a somewhat rudimentary spur. Dorsal plate broadly emarginate. Ventral plate short and broad. Terminal lobes of ovipositor broad.

Key to species.

I. Wings normal, *i.e.*, long and narrow and reaching to two-thirds the length of abdomen — *H. ischaemi* Felt.

II. Wings very short, *i.e.*, less than one-fourth the length of body — *H. subaptera* Felt.

Hormomyia ischaemi Felt.

1920. *Hormomyia ischaemi*, Felt, *Pusa Bull.*, No. 89, p. 46.
1920. *Hormomyia ischaemi*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 271.
1928. *Hormomyia ischaemi*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 6.

This is a dark brown or dark reddish-brown species, which produces galls on *Ischaemum pilosum* Hack. Felt believes that *Oligotrophus ischaemi* Kieff. is probably identical with this species, which I am inclined to doubt.

Hormomyia subaptera Felt.

1926. *Hormomyia subaptera*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, IX, p. 224.

This is a smaller midge with relatively very short wings. Felt has only provisionally referred it to this genus.

Genus **Dyodiplosis** Rubs.

1899. *Hormomyia (partim)*, Rubsaamen, *Biol. Central-blatt.*, XIX, p. 602.
1912. *Dyodiplosis*, Rubsaamen, *Zeit. Wiss. Insektenbiol.*, VIII, p. 49.
1913. *Dyodiplosis*, Kieffer, *Gen. Ins.*, fas. 152, p. 205.
1920. *Dyodiplosis*, Brunetti, *Rec. Ind. Mus.*, XVII, pp. 14, 271.
1921. *Dyodiplosis*, Felt, *Bull. N. Y. St. Mus.*, Nos. 231-232, p. 208.
1925. *Dyodiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 170.
1928. *Dyodiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 12.

This genus is distinguished from *Hormomyia* H. Loew by the thorax being not much produced over the head to two moderately long circumfila on the flagellate antennal segments of female and by the truncate ventral plate. Third vein united with costa well beyond the apex of wing. Basal clasp segment unarmed, style not expanded apically and not strongly chitinised at the sides. Ovipositor short.

Seven Indian species, breeding in grasses, were described by Felt : *generosi* (58), *andropoginis*, *cornea*, *fluvialis* (63), *indica*, *monticola* and *plumosa* (72).

Genotype.—Dyodiplosis arenaria (Rubs.). (By original designation.)

Genus **Lowiola** Kieff.

1875. *Diplosis (partim)*, Loew Franz, *Verh. zool.-bot. Ges. Wein.*, XXV, p. 20.
1896. *Lowiola*, Kieffer, *Miscell. Entomol.*, p. 5.
1913. *Lowiola*, Kieffer, *Gen. Ins.*, fas. 152, p. 206.
1920. *Lowiola*, Brunetti, *Rec. Ind. Mus.*, XVII, p. 15.
1925. *Lowiola*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 172.
1928. *Lowiola*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 13.

Palpi triarticulate. Antennal segments without any unusual processes, circumfila loops as long as or longer than enlargements. Third vein united with costa beyond the apex of wing. Basal clasp segment not distinctly lobed, dorsal plate deeply and narrowly incised, ventral plate narrowly emarginate. Ovipositor moderately long, lamellae deeply bilobed.

Felt (58) described one Indian species, *costata*, from Ceylon.

Genotype.—Lowiola centaurae (H. Loew.).

Genus **Orseolia** Kieff. & Mass.

1902. *Orseolia*, Kieffer & Massalongo, *Marcellia*, I, p. 56.
1913. *Orseolia*, Kieffer, *Gen. Ins.*, fas. 152, p. 151.
1925. *Orseolia*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 173.
1928. *Orseolia*, Senior-White, *Cat. Ind. Mus.*, pt. 15, p. 7.

This genus is related to *Orseoliella* Kieff. but differs in its biarticulate palpi. Stems of first flagellate antennal segment of male have a lateral tooth near its middle. Claws simple on all legs. Dorsal plate narrowly incised. Ventral plate longer and rounded apically.

The genotype, *cynodontis* Kieff. and Mass., has been recorded by Kieffer (111) from Ceylon and by Felt (72) from South India. It breeds in various species of *Cynodon*.

Genus **Horidiplosis** Felt.

1920. *Horidiplosis*, Felt, *Mem. Dept. Agric. Ind., Entomol. Ser.*, VII, p. 10.
1925. *Horidiplosis*, Felt, *Bull. N. Y. St. Mus.*, No. 257, p. 175.
1928. *Horidiplosis*, Senior-White, *Cat. Ind. Ins.*, pt. 15, p. 7.

Palpi uniarticulate. Antennal segments 14 in both sexes, circumfila not doubled. Wings hyaline. Claws simple on all legs. Dorsal plate deepdly, broady and roundly emarginate. Ventral plate broadly emarginate. Ovipositor stout and with a length about two-thirds that of the abdomen.

The type, *H. fici* Felt, is a dark, reddish-brown or yellowish species, with long tapering palpus, and breeds in pustule-like galls on leaves of *Ficus infectoria* Linn.

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