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## A revision and phylogenetic analysis of the genus *Lyponia* C.O. Waterhouse, 1878 (Coleoptera, Lycidae)

by L. Bocák

**Abstract.** The subtribe Lyponiina (Lycidae, Platerodini) comprising the only genus *Lyponia* Waterhouse is diagnosed and revised. Three subgenera and several informal species groups are recognised. *Ponyalis* Fairmaire, long time having been considered a junior synonym of *Lyponia* Waterh., is revived and it is proposed to be a subgenus of *Lyponia* Waterh. A new subgenus *Weiyangia* subg. n. is described. A key to 29 recognised species is provided. A cladogram for 11 species groups derived through parsimony analysis using Hennig86 program is presented and used for the classification of subgenera and species groups. All taxa are redescribed and important diagnostic characters are illustrated. The following species are described: *L. (Weiyangia) pertica* sp.n., *L. (Weiyangia) taliensis* sp.n., *L. (s.str.) kuatunensis* sp.n., *L. (s.str.) minuta* sp.n., *L. shennongjiensis* sp.n., *L. (s.str.) gongashanica* sp.n., *L. (Ponyalis) sichuanensis* sp.n., *L. (Ponyalis) fukiensis* sp.n., *L. (Ponyalis) tryznai* sp.n., *L. (Ponyalis) gracilis* sp.n., *L. (Ponyalis) klapperichi* sp.n. Several synonyms are proposed: *L. pieli* Pic, 1937 (= *L. debilis* Waterh., 1878); *L. limbaticollis* Pic, 1926, *L. patruelis* Kleine, 1939 (= *L. laticornis* Fairm.); *L. aurantiaca* Pic, 1923, *L. ochraceicollis* Pic, 1927, *L. robusticollis* Pic, 1939 and *L. waterhousei* Gorham, 1890 (= *L. himalejica* Bourg., 1885).

**Key words.** Coleoptera - Lycidae - *Lyponia* - phylogenetic analysis - zoogeography - taxonomy - Palaearctic and Oriental Regions.

### Introduction

Subtribe Lyponiina (BOCÁK & BOCÁKOVÁ, 1990) comprises an easily recognisable genus *Lyponia* Waterhouse, 1878 only, which is widely distributed in the eastern part of the Palaearctic Region and some species occur in the most northern part of Oriental Region. The genus dealt with in this paper belongs to the subfamily Erotinae which is one of two largest subfamilies of Lycidae and comprises nearly 1000 species distributed throughout the world. Members of this subfamily are most abundant in humid tropical regions.

Considering Lyponiina as presented here, the first species described in this group was *Lyponia debilis* Waterhouse, 1878 described from China more than a century ago. Later, FAIRMAIRE (1889, 1899), PIC (1912, etc.) and BOURGEOIS (1885) reported several new species from Indochina and central China and KIESENWETTER (1874) added two new species from Japan. China was inaccessible in the first half of this century and therefore only several more species were described from Taiwan (KLEINE, 1924) and Burma (KLEINE, 1939), some of them were synonymized in subsequent papers. In 60's and 70's the fauna of Japanese and Taiwanese Lycidae was studied by NAKANE (1967, 1969, 1971, 1973). The last new species was reported by NAKANE (1983) from Nepal. No complete revision has been published. Incomplete key of world *Lyponia* species was given by KLEINE (1924), later commented by PIC (1926) who put into *Lyponia* also species described in *Ponyalis* Fairm. which were omitted by KLEINE (1924). The genus *Ponyalis* was proposed by FAIRMAIRE (1899) for *Lyponia laticornis* Fairm., but subsequently it was synonymized to *Lyponia* by PIC (1926). KLEINE (1933) did not accepted this act and he used the name *Ponyalis* Fairm. in his catalogue of world Lycidae. NAKANE (1969) followed the view of PIC (1926). The authors publishing in Lycidae were longer time perplexed by the synonymic status of *Ponyalis* Fairmaire because the type species were not studied. NAKANE (1969) rectified only the most serious omissions in Japanese and Taiwanese fauna by providing redescrptions and identification key. The fauna of continental China and adjacent regions in the south has not been studied since 1920's.

Most type specimens of the species described by other authors were available for this study. With exceptions mentioned further all types of species occurring out of Japan and Taiwan were examined. During my previous work on the fauna of Taiwan I studied all Kiessenwetter's types from Japan, but they were not studied again and are not mentioned in this study. I have not had at my disposal the types of species described after World War II by Ohbayashi and Nakane but I have studied specimens which were identified by Prof. T. Nakane deposited and in the collection of Frey and some specimen from the private collection of Mr. Kyioshi Matsuda. The species described by Prof. Nakane are very well known and whole Japanese fauna was treated by NAKANE (1969) in detail before. This study is designated to be a revision, despite the fact that the identity of Japanese and Taiwanese species was taken over from the works of Prof. Nakane, because no further study was needed. Despite long search in the collection of Museum National d' Histoire Naturelle in Paris I was not able to find the type specimens of *Lyponia diversicornis* Pic, 1926, *Lyponia robusta* Pic, 1922 and *L. guerryi* Pic, 1939. According to very limited information given in the original description they are separable from all species at my disposal, but very low quality of Pic's descriptions calls for a study of holotypes.

### Materials and Methods

All species descriptions represent a male individual, either the holotype when cited in the material examined, or another male specimen from the material cited if the holotype is a female. Male genitalia were examined digesting away non-chitinous tissue in 10 per cent KOH boiled for 3 to 5 minutes. Female genitalia were treated in the same way and then stained in the glycerine solution of chlorazol black. Male genitalia and other selected diagnostic characters were designed using eyes piece grid. Sclerotised structures were mounted in Entellan medium on labels, membranous parts of female internal genitalia were placed in glycerine vials attached to the appropriate dry mounted specimen.

For the character analysis I examined 29 species from the genus *Lyponia* Waterh. In most cases both sexes were available and studied. The females are not known from *L. tryznai* sp.n. and *L. nepalensis* Nak. For better understanding of *Lyponia* characters the representatives of many genera of Platerodini were dissected and studied. First runs of Hennig86 analysis used only a hypothetical outgroup which represented a synthesis of more representatives of Erotinae. The real taxon was not used originally because many apparently advanced character states were present in many of taxa studied in combination with the primitive ones. During the analysis two genera of other Erotinae were chosen and added to the character matrix instead of a hypothetical taxon. A cladistic relationships among the species of *Lyponia* were estimated using J. Farris' program Hennig86 version 1.5 (FARRIS, 1988, LIPSCOMB, 1994). After preparing an initial character data set the number of taxa was reduced by replacing the groups of the closely relative species groups by the single representative. The differences between very closely relative species are very minute and they did not allow coding in the data set. The character states given in the character matrix are common for all species included in the respective species group. A series of runs were done using different

procedures, applying different weights for different characters, switching on/off individual characters and alternating additive/non-additive characters. The presented cladogram represents strict consensus tree based on four equally parsimonious cladograms produced by implicit enumeration and branch swapping. Character numbers of synapomorphies shown in the cladogram correspond with the numbers given in the character matrix.

### Depositories

BM	British Museum (Nat. Hist.), London (Mrs. J. Beard)
KM	collection of Mr. Kiyoshi Matsuda, Takarazuka City
MAKB	Museum Alexander Koenig, Bonn (Dr. M. Schmidt)
NHMB	Naturhistorisches Museum, Basel (Dr. M. Brancucci)
MP	Muséum d'Histoire Naturelle, Paris (Dr. J. Ménier)
NRMS	Naturhistoriska Riksmuseet, Stockholm (Dr. Per Lindskog)
SK	collection of Dr. Sergei Kasantsev, Moscow
SMNS	Staatliches Museum für Naturkunde, Stuttgart (Dr. W. Schawaller)
ZIW	Instytut Zoologii PAN, Warszawa (Dr. S. A. Slipin'ski)
LMB	author's collection

### Natural history

The representatives of the genus *Lyponia* occur quite seldom in whole area of distribution. Regularly, only small series are collected and usually no more than five specimens are collected in several days of the collecting activity on a locality. Larger series of specimens were collected only by J. Klapperich in Fukien (*L. klapperichi* sp.n.) in 1938 and 1946. The material deposited in the Basel and Bonn museums included together nearly 150 specimens. Altogether, only about 350 specimen were available for this study, but they represent the substantial part of *Lyponia* representatives deposited in the world collections.

In Sichuan and Yunnan, where the highest diversity has been found, *Lyponia* species occur in mountainous areas between 1000 and 3900 m above sea level, but most specimens were collected in high mountains in elevations over 2500 m a. s. l. Most specimens were collected in spring (from end of April in lower mountains until the end of June in the highest elevations), and according to information of collectors there were no specimens of *Lyponia* on these localities when these localities were visited later. The material of J. Klapperich was collected mainly in April and May in Fukien and Taiwan, also specimens of *Lyponia himalejica* were collected by Mr. P. Pacholátko in the beginning of May in northern Thailand and no specimens were collected on these localities later during the year. The densely forested mountain habitats are preferred by Chinese species. They were mostly collected in mountain oak forests or oak - pine forests (*Quercus* sp., *Pinus* sp.) if in elevations up 3000 m or in fir forests (*Abies* sp.) in higher elevations. Nearly no specimens were collected in secondary forests, drier pine forests in Yunnan or oak forests of Northern Thailand, where longer dry period occurs. Less than 30 specimens of *Lyponia* Waterh. from Thailand have been at my disposal and at least half of them has been collected recently in tropical rain forests in Chiang Mai province.

The specimens from Yunnan, Sichuan and Thailand were collected mainly by sweeping of the lowest stratum of forest vegetation or they were beaten from *Quercus*



branches. Only day activity of adults was observed. They have not been collected at light despite intensive use of light collecting method in Thailand on the localities, where representatives of the genus *Lyponia* Waterh. occur. This view is supported by the fact, that both sexes of all *Lyponia* species have only smaller eyes of the same size. In Lycidae males of many species have eyes hemispherically prominent and much bigger than females and these species are regularly collected at light. Adults of *Lyponia* Waterh. have not been associated with rotten wood, but rotten wood is expected to be an usual habitat of larvae. The adults show very limited activity and prefer partly shaded margins of forest or lighter parts of forest with well developed herb stratum. No specimens were collected in open shrub or grass land without trees. In Thailand all specimens were collected in moist dense tropical forests, usually in deeper valleys along streams, where higher moisture occurred throughout the year. Only some specimens were collected in a dried habitat (Soppong Pai Pass in Mae Hong Son Province) in Northern Thailand, but they occurred in the close vicinity of deep shaded valleys in karst area. The high flying activity of different groups of Coleoptera was observed on this locality and a migration of *Lyponia* individuals is supposed in this case. This case shows the possibility of active dispersal of *Lyponia* adults within some kilometres span. No information is at my disposal about natural history of species occurring in northern part of the area of distribution.

Immature stages for the subtribe Lyponiina have not yet been described and I have not had any larvae of this group at my disposal. Recently, several larvae of *Lyponia quadricollis* Kiesw. have been collected by Mr. Kiyoshi Matsuda in Japan (letter information).

### Distribution

The centre of distribution of the genus *Lyponia* is located in the eastern part of the Palaearctic Region. Northern limit is lying in Chinese provinces Kansu, Shanxi and Shenxi and on northern Honshu on Japanese islands. There are no records from Hokkaido island and from the territory of Eastern Russia. Unfortunately, mainly because of very low collecting activity, I do not have any data from north-eastern China and Korean peninsula, where, at least in coastal area with less continental climate, the occurrence of several species can be supposed. Eastern limit involves Taiwan with a quite rich fauna of *Lyponia* in higher mountains. The most southern records of *Lyponia* originate from the northernmost part of Vietnam (mountain area on Chinese border), northern Laos, northern Thailand (most data from the vicinity of Chiang Mai and Mae Hong Son province on Burmese border). Only very old data are available from Burma and North Eastern India, respectively, also mainly because of the inaccessibility of these regions for research. Only one species (*Lyponia nepalensis* Nak.) has been collected in Nepal Himalayas by Japanese expedition in 1968 (1♂) and by Dr. W. Schawaller in 1995 (1♂), despite very intensive collecting activity in this area. Some species are newly described from western Sichuan and western Yunnan from materials collected in recent years. The fauna of higher mountains of these Chinese provinces comprises the most primitive representatives of the genus *Lyponia*. The distribution of subgenera is shown on map 1.

Unfortunately, our knowledge of the fauna of eastern part of China but Fukien is extremely limited. Some new species were recognised in the material of J. Klapperich from Fukien (1938 - 1946) and one new species has been collected in central China in 1997. Discovery of some additional species from a vast area between Yunnan and Fukien can be supposed.

Some vicariance events can be hypothesised in spite of rather limited material. The most apparent is the border between continental China and Taiwan. Several sister species are vicariant in this area (*L. dolosa* Kln. and *L. fukiensis* sp.n.; *L. gestroi* Pic and *L. alternata* Fairm.), see map 3. Another very sharp vicariance border separates the fauna of Japanese islands and China, and Japanese island and Ryukyu Archipelago, respectively. These limits are purely geographical.

A cluster of the closely related species has been observed in coastal area of Asiatic mainland and on the adjacent islands. The main part of the *alternata* group (*L. quadricollis*, *L. gestroi*, *L. oshimana*, *L. alternata*) is an excellent example of so called „superspecies“ as discussed by BRUNDIN (1981). These species of the *alternata* group differ first of all in the shape of male antennae and in the structure of elytral costae. Some less apparent difference has been found in a slightly different shade of elytra colour of Taiwanese *L. gestroi* Pic. These species are very close relatives and their origin can be credited very probably with multiple vicariance events. All species of this group are very advanced within *Ponyalis* Fairm. The remaining member of the *alternata* group the species *L. nigrohumeralis* Pic stays apparently apart from this cluster (shows more primitive shape of first antennal segment) and its distribution is limited to the mountains of northernmost part of Sichuan, to Kansu and southern Shanxi provinces. The only species with the same coloration of pronotum and at also bearing some plesiomorphous character states is *Lyponia tryznai* sp.n. from Sichuan. I do not have more persuading characters for assignment of *L. tryznai* to the base of the *alternata* branch and I have treated it as a separate species group in the phylogenetic analysis. The present lack of material from a vast area between Sichuan mountains and Fukien impede the construction of a more robust hypothesis.

Similar situation, but based on ecological requirements, has been observed in northern Vietnam, Laos, Thailand and western Yunnan. Closely related species *L. laticornis* Fairm. and *L. himalejica* Bourg. are vicariant in prevalent part of their ranges and when they occur in common areas *L. himalejica* Bourg. occurs in lower elevations and *L. laticornis* Fairm. in higher ones. Both species were collected in the valley of Nu river (upper Salween), but this valley is well known for being inhabited by southern faunistic elements and no exact data about elevation are given on locality labels. The given span 1500 to 2500 involves both subtropical non-deciduous forests and much colder mountain oak - pine forests in which *L. laticornis* Fairm. has been collected in Central and Northern Yunnan. Northern Vietnam is another area where both species occur but no additional data about possible ecological separation of these species are at my disposal. Only *L. laticornis* Fairm. has been collected in central China (NW Guizhou) and in higher elevations of north western Yunnan, where this species is quite common. On the other hand, only *L. himalejica* has been collected in moist tropical forests of northernmost Thailand (about 15 spec. in recent years, which represent about

a half of all specimens known in collections). Simple vicariance event followed by a dispersal is the most probable explanation of the observed distribution.

Multiple speciation events in consequence of geographic separations are expected also in the mountains of western Yunnan and Sichuan. These species (*L. gongashanica*, *L. minuta*, *L. brevicollis*, *L. pertica* and *L. taliensis*) are very probably separated by deep valleys (map 2). Species from the subgenus *Weiyangia* subg.n. is an example. Very common *L. pertica* sp.n. (in comparison with other *Lyponia* species) has not been found north of the Jinsha river (the upper Yangtse), the very close *L. brevicollis* Fairm. is restricted to the northern bank of the Jinsha, but it has been collected both in the very high mountains of Gonga Shan massive and much lower Emei Shan, with very mild climate. The third known species from this subgenus, *L. taliensis* sp.n., is the only until now collected representative of the group on the Cang Shan mountains. Some other species from subgenera *Lyponia* s.str. and *Ponyalis* Fairm. are endemic to various mountains of Sichuan, but a limited zoogeographical data material do not make possible a more detailed analysis.

### Phylogenetics

Monophyly of the subtribe Lyponiina and its position within Platerodini:

The subtribe Lyponiina is an isolated group within the tribe Platerodini. The placement of Lyponiina within Platerodini seems clear and it is based mainly on the structure of pronotum, absence of paramerae, shortened spiculum gastrale and valvifers and structure of elytral costae. Lyponiina combines some very advanced characters with some apparently primitive ones. Fully developed primary and secondary costae are observed here accompanied with sharply marked transverse costae at least in the half of elytra. This structure reminds of the tribe Erotini and it is considered to be very primitive, because very similar arrangement of costae is also known from other related groups in Lycidae. In the subgenus *Weiyangia* subg.n. the filiform antennae are present which are seldom occurring in Lycidae (they are usually at least slightly compressed within Lycidae) and are indisputably also very primitive. The polarisation of this character is based on the outgroup comparison with related families of cantharoid branch of Elateroidea and the fact that the tendency toward flattening and prolongation of antennal lamellae has been observed in *Lyponia* Fairm. in correlation with other transformation series.

The monophyly of the subtribe Lyponiina is supported by the following synapomorphies:

1. Dorsoventrally flattened and dilated phallus

The dorsoventral flattening of phallus is exclusive for *Lyponia* Wat. within Platerodini and Erotini which forms the subfamily Erotinae according to present knowledge (BOCÁK & BOCÁKOVÁ, 1990). The phalli of Platerodinina are very diversified in shape but at least the basal parts of them is always rounded in transversal section.

2. Bent margin of phallobase (Fig. 51)

This structure has not been observed in any other group within Lycidae. The bent part is sometimes minute in *Lyponia* but it is always present.

3. Basally prolonged coxites of female genitalia

Coxites of female genitalia are prolonged very characteristically in basal part and that is why valvifers are not attached apically (Fig. 20). When observed ventrally, coxites and valvifers seem to be fused.

4. Primary costa 3 weaker and at least slightly shortened, costae 2 and 4 at least slightly stouter.

The degree of shortening is variable in *Lyponia*, but it is always present. For detailed description of arrangement of costae see redescription of the genus *Lyponia* Wat.

#### Character set for *Lyponia* cladogram:

The polarisation is based on the outgroup comparison. As outgroups were used numerous representatives of the tribes Platerodini and Erotini and later for Hennig86 analysis the genera *Melaneros* Fairm. and *Dictyoptera* Muls. were chosen and their characters coded. The arguments for monophyly of the subtribe Lyponiina are given above and only some characters are used in a character matrix for supporting this hypotheses.

(0) Elytral costae: 0 - transversal costae sharp, fully developed. 1 - transversal costae obtuse, less apparent.

(1) Shape of elytral cells: 0 - cells quadrate or irregular. 1 - cells transversal, very uniform.

(2) Shape of pronotum: 0 - pronotum narrow, without broad flattened margin. 1 - pronotum wide, broad flattened area present.

(3) Colour of pronotum: 0 - pronotum at least partly red. 1 - pronotum black.

The polarisation of this character is questionable, because no outgroup comparison is possible (the character is variable in outgroup). Within *Lyponia* this character is restricted only to a small group of species. The colour of pronotum of *Melaneros* is coded as "?", which means for Hennig86 missing or both state character (colour of pronotum is variable in *Melaneros*).

(4) Male tergite 10: 0 - fully developed, partly sclerotised, pigmented, with sparse setae in apical part. 1 - rudimentary, membranous, not pigmented, without setae.

(5) Shape of upper margin of phallobase: 0 - margin of phallobase simple, without any structure. 1 - margin of phallobase bent in various degree.

(6) Shape of median lobe in cross-section: 0 - rounded in cross-section at least in basal half of the length. 1 - median lobe flattened.

(7) Shape apical part of median lobe: 1 - apical part slender, pointed. 2 - apical part wide, opened apically. 3 - opened subapically, with lateral thorns. Character states are considered ordered.

(8) Internal sac: 0 - internal sac membranous, not pigmented. 1 - internal sac short and robust. 2 - internal sac extremely slim. Character states are considered ordered.

(9) Attachment of valvifers: 0 - valvifers attached apically. 1 - basal part of coxites prolonged, valvifers attached laterally.

(10) Shape of basal part of coxites: 0 - basal part of coxites diverging (Fig. 84). 2 - basal part of coxites fused, sac-like (Fig. 20).

(11) Length of spermathecal duct: 0 - spermathecal duct short. 1 - spermathecal duct very long.

(12) Antennae of male: 0 - antennae filiform. 1 - antennae lamellate

(13) Shape of antennal segment 3 of male: 0 - segment 3 filiform. 1 - segment 3 flattened, without lamella. 2 - segment 3 flattened, with short lamella. 3 - segment 3 with flattened setose area. Characters are considered ordered.

(14) Shape of antennal segment 1 (both sexes): 0 - segment 1 simple. 1 - segment 1 flattened.

(15) Lamellae of male antennal segments: 0 - antennal lamellae missing or moderately long. 1 - antennal antennae extremely long.

(16) Median lobe: 0 - without any constriction in the middle part. 1 - constricted in the middle part.

(17) Shape of male trochanters of fore legs: 0 - male trochanters short and slim. 1 - male trochanters prolonged, robust, with flattened membranous area beneath.

(18) Shape of apical part of phallus: 0 - apex of phallus without thorns or thorns slim and otherwise shaped (Figs 61 - 67, 72 - 81). 1 - small thorns of special shape present (Figs 68 - 70, 94).

### Matrix of character data set:

No.of character	0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	
											0	1	2	3	4	5	6	7	8
Taxon																			
<i>Melaneros</i>	1	0	0	?	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Dictyoptera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>himalejica</i> group	0	1	1	0	0	1	1	2	1	1	1	1	1	1	1	0	0	0	0
<i>sichuanensis</i>	0	0	0	0	0	1	1	2	1	1	1	1	1	1	0	0	0	0	0
<i>tryznai</i>	0	0	0	1	0	1	1	2	1	?	?	?	?	1	1	1	0	0	0
<i>nigroscutellaris</i> group (pars)	0	0	0	0	0	1	1	1	2	1	0	0	1	3	0	0	0	0	1
<i>kleinei</i> group	0	0	0	0	0	1	1	1	2	1	0	0	1	3	0	0	0	0	0
<i>nana</i>	0	0	0	0	0	1	1	1	1	1	0	0	1	3	0	0	0	0	0
<i>gracilis</i> group	0	1	0	0	0	1	1	2	1	1	1	1	1	1	1	0	0	0	0
<i>alternata</i> group	0	1	0	1	0	1	1	2	1	1	1	1	1	1	1	0	0	0	0
<i>dolosa</i> group	0	0	0	0	0	1	1	2	1	1	1	1	1	1	0	1	0	0	0
<i>debilis</i> group	0	0	0	0	0	1	1	1	1	1	0	0	1	2	0	0	0	1	0
<i>brevicollis</i> group	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	1	0	0

Species included in the species groups:

***himalejica*** group: *Lyponia laticornis* (Fairmaire, 1899), *L. himalejica* Bourgeois, 1885.

***nigroscutellaris*** group (pars): *Lyponia nigroscutellaris* (Ohbayashi, 1956), *L. minuta* sp.n. *L. shennongjiensis* sp.n., *L. gongashanica* sp.n.

***kleinei*** group: *Lyponia kleinei* Nakane, 1967, *L. palpalis* Nakane, 1971.

***gracilis*** group: *Lyponia gracilis* sp.n., *L. ishigakiana* Nakane, 1961

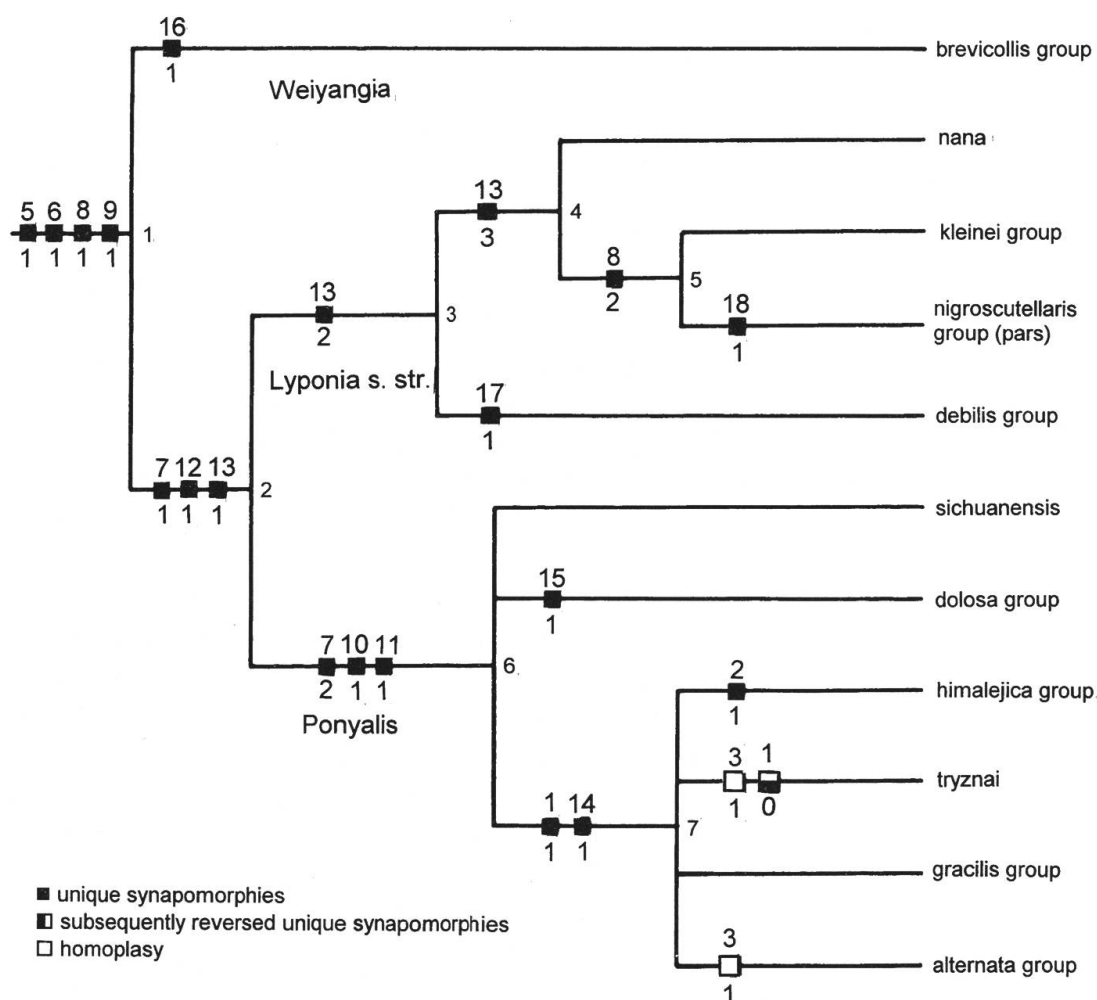
***alternata*** group: *Lyponia alternata* Pic, 1927, *L. gestroi* (Pic, 1912), *L. oshimana* Nakane, *L. quadricollis* (Kiesenwetter, 1874), *L. nigrohumeralis* Pic, 1938

***dolosa*** group: *Lyponia dolosa* Kleine, 1924, *L. fukiensis* sp.n.

***debilis*** group: *Lyponia debilis* C. O. Waterhouse, *L. kuatunensis* sp.n., *L. nepalensis* Nakane, 1983, *L. delicatula* (Kiesenwetter, 1874), *L. osawai* Nakane, 1969

***brevicollis*** group: *Lyponia brevicollis* Fairmaire, 1889, *L. pertica* sp.n., *L. taliensis* sp.n.

Four equally parsimonious trees were obtained by the procedure of implicit enumeration and consequently the strict consensus tree was counted. The equal weight was given to all characters in final run of Hennig86. The program considers all characters ordered by default. The matrix was run also with characters 7 and 8 unordered. The topology of trees did not differ in these cases and the retention index was the only changed indice, but the change was only one point up. The indices were as follows: length of tree 24, consistency index 95 and retention index 96 (97 when characters 7 and 8 considered to be unordered). The obtained strict consensus tree was used for classification of the genus *Lyponia* Wat.



Cladogram 1: Strict consensus tree for the genus *Lyponia* Wat.



## Taxonomy

### *Lyponia* C. O. Waterhouse

*Lyponia* C. O. WATERHOUSE, 1878: 99; Illiger, 1879, Typ. Spec. Col. p. 24; BOCÁK & BOCÁKOVÁ, 1990: 623 - 676.  
Type species: *Lyponia debilis* WATERHOUSE, 1878 (by original designation)  
*Ponyalis* FAIRMAIRE, 1899: 623; PIC: 1926: 69.

**Differential diagnosis.** Pronotum without carinae, with very shallow depressions only, four primary and five secondary costae developed on each elytron, primary costa 3 shortened, male genitalia dorsoventrally flattened.

**Description.** Body small to medium-sized, flattened, elytra subparallel, body moderately sclerotized, covered with dense short pubescence, body coloration black to brownish black, elytra always cinnabar red to testaceous with all intermediate stages, only *L. nigrohumeralis* Pic with humeral part and primary costae of elytra black. Pronotum black or red, very often with dark patch in middle.

Head small, partly concealed in pronotum, without rostrum, orthognathous. Cranium moderately flattened, slightly convex dorsally, in frontal part antennal tubercles developed in various degree, followed behind by shallow to deep transversal depression. Only weak gular sutures observable. Tentorium mostly membranous, two slender long sclerotized hind branches attached to posterior tentorial pits. Antennal caves approached each other, distance between them shorter than their diameter, one dent on frontal margin of cave present. Antennae filiform to flabellate in males, filiform to serrate in females (Fig. 7). Combined length of antennal segments always at least slightly over half of the body length, never reaching over three fourths of length of elytra. Antennal segment 1 globular in apical half or compressed in upper part and with quite sharp edge in frontal view consequently (Figs 21 - 49). Segment 2 small, about 4× shorter than following one, with two small acute thorns fitting against adjacent edge of segment 1 in frontoapical part (Figs 23, 36, 44), slightly constricted in basal third. Following segments filiform to slightly subserrate (subgenus *Weiyangia* subg.n.) to apparently flattened (remaining subgenera). Segment 3 sometimes modified, with field of dense setae (Fig. 36, see the *nigroscutellaris* group). Lamellae of male antennae prolonged gradually from segment 3, 4 or 5 to segment 7, lamellae of segments 7 to 10 with lamellae of approximately equal length. Lamellae attached to apical part usually, rarely to middle part (Figs 26, 28; the *dolosa* group). Segment 11 elliptical to very long, parallel-sided. Whole antennae covered with uniform short dense setae. No longer setae with constant position observed. Eyes small, but prominent, distance between them approximately 2.5× longer than biggest diameter of eyes. Mouth opening wide, situated in bottom part, rounded (Fig. 1). Clypeus wide, its margin concave, wide, basal part of labrum retracted in cranium, only very narrow transverse part of labrum observable without dissection, with long setae at apical margin. Basal processes directed downwards, long and robust, hypopharynx well sclerotized, with robust apical processes attached to labrum (Fig. 2). Mandibles slender, quite long, slightly curved, inner side without any dent (Fig. 4), in closed position apex of one mandible reach middle of opposite one, with several long setae in basal part, apical one bald. Maxillae with well developed galea and partly reduced lacinia, stipes plate-like, cardo small, more sclerotised and pigmented, three dimensional with process

directed to interior of cranium. Palpifer well developed, covered with setae on outer surface, maxillary palpi 4 segmented, segments 1 to 3 only slightly widened at apex, segment 2 nearly as long as segment 1 and 3 combined, segment 4 much wider, securiform, obliquely cut at apex (Fig. 6). Labium two segmented, simple, labial palpi 3 segmented, segments 1 and 2 shorter, their combined length equals to that of segment 3 alone (Fig. 3).

Connecting membrane between head and prothorax extensive, retracted in prothorax, bearing cervical sclerites, each sclerite partly divided in two subsegments, frontal one narrow, curved in apical half, widened backwards, basal one transverse, simple (Fig. 11).

Prothorax with laterally and frontally widened pronotum, no apparent costae present, only small remnants of attachment to frontal and lateral margins of pronotum observable (Fig. 9). Prosternum narrow, transverse, prosternal process short, bifurcated laterally, with internally projected processes, coxal caves open, wide (Fig. 11). Prothoracic trochantins three dimensional, upper side triangular, with long median process, short processes protruded internally (Fig. 11)

Wings well developed, arrangement of veins uniform within group (Fig. 13). Elytra flat, subparallel to parallel, usually slightly widened backwards, each elytron with nine longitudinal costae, every other costa stouter in primitive situation, the stouter (e.g. costa 2, 4, 6 and 8 counted from elytral suture) ones are called primary costae, weaker ones between them secondary costae. Primary costae are designated 1 to 4 throughout following descriptions (Fig. 14). All costae stouter at humeri, primary costa 4 forming edge of elytron in basal part. Primary costa 1 and 3 shortened in various degree, primary costa 2 often stouter than remaining ones, sometimes the primary and secondary costae equalised and primary costae can be designated according to their position only. Numerous transverse costae developed between longitudinal ones. They form elytral cells of various shape. Costae covered with numerous setae of the same colour as area where setae attached. Bottom of elytral cells slightly differently coloured, finely structured, with less numerous shorter setae.

Legs moderately to strongly compressed, depressed areas enabling retraction of following part of leg present on coxae, femora and tibiae (designated as a, b, c in fig. 15). Tibiae slightly curved, with stout movable thorn at apex. Tarsal segments 1 - 4 with euplantulae which are gradually bigger from segment 1 to 4. Segments 1 - 3 ring-like, bottom part very narrow, bridge-like, segment 4 open, lateral parts not connected (Fig. 16).

Abdomen flat, freely movable, slightly sclerotised. Female sternite 8 with moderately long spiculum gastrale (Fig. 19), tergite 9 simple (Fig. 18). Male apical segment slender (Fig. 89).

Male genitalia without paramerae, provided only with rounded, loosely attached phallobase and stout elongated phallus. Phallobase slightly asymmetrical, egg shell shaped, widely opened ventrally, margin of ventral opening narrowly bent, bent part with small processes (Figs 62 - 64). Phallus simple, slender (Fig. 56 - 58) to subparallel, stouter (Figs 61 - 70). Apical to subapical thorns present in most species. (Figs 50 - 54, 72 - 81). Internal sac pigmented and sometimes partially sclerotised, robust to very slender, often longer than phallus, with numerous small setae in apical half (Fig. 68 - 70)

Ovipositor with basally fused coxites, tergite 9 well developed, firmly connected with coxites in basal third, free apically. Styli small, slender, with some setae only, no constant position of setae has been observed. Apex of costae densely covered with setae (Fig. 20). Valvifers shorter, slightly curved, stout, with longitudinal lamella in basal part, attached to coxites laterally. Vagina narrow, moderately long, with two big lateral glands in apical fourth, spermaduct short to long, spermatheca slightly wider than spermaduct, with slender dichotomically branched gland attached to apical part. (Fig. 17)

Sexual dimorphism: The expression of sexual dimorphism is limited to the shape of male antennae and size of body. The males are generally 10 to 20 percent smaller but the difference between the smallest and biggest specimens of either sexes is much bigger.

The shape of antennae are different in males and females in all species of *Lyponia* but the subgenus *Weiyangia* subg.n. In *Weiyangia* all species have antennae filiform in both sexes. In other subgenera sexes differ considerably. Their females have more or less serrate antennae and female segments are considerably much more serrate in species with very long lamellae in males. Males generally have long lamellae of segments 6 to 10 in the subgenus *Ponyalis* Fairm. or segments 4 to 10 in *Lyponia* s.str., the *nigroscutellaris* group, respectively, or segments 3 to 10 in the *debilis* group of the same subgenus. The flat area covered with dense setae on segment 3 (the *nigroscutellaris* group) is well developed in males only and very slightly longer setae are found in females. In females no flattened area is present.

Variability: Moderate degree of variability in body coloration and shape of individual parts of body has only been found in *Lyponia*. When margins of pronotum or antennal tubercles are lighter then the extent of lighter parts is usually the subject of variability. The length of male antennal lamellae is not constant in the *laticornis* group but it is utilizable for distinguishing of the members of the *alternata* group which is relative to the *himalejica* group. The shape of pronotum is another subject of variability. Nakane (1969) designed some examples of *L. quadricollis* (Kiesw.) but the similar degree of variability has been found in all species where sufficient number of specimens was at my disposal.

### Key to the identification of *Lyponia* species

- 1 Antennal segments 3 - 11 rounded or very slightly flattened in cross-section, male antennae never with lamellae, male genitalia slender, simple, more or less apparently constricted in middle (Figs 56 - 58). (subgenus ***Weiyangia* subg.n.**) .....2
- Antennal segments 4 - 11 apparently flattened in cross-section, if only slightly flattened than antennal segment 3 of male antennae with flattened surface in frontal part (Fig. 36), male genitalia usually with lamellae, apex of male genitalia usually with lateral thorns, if without thorns than robust, slightly curved .....4
- 2 Male genitalia apparently constricted in the middle .....3
- Male genitalia only very slightly constricted, simple (Fig. 57), north western Yunnan .....***L. (Weiyangia) pertica* sp.n.**
- 3 Phallus in apical half gradually narrowing to apex, constriction in middle of phallus followed by apparently widened part (Fig. 56), length of body 9.0 - 9.9 mm, head brown or at least antennal tubercles lightly coloured, Western Sichuan.....***L. (Weiyangia) brevicollis* Fairmaire**

- Phallus in most part of apical half parallel, only at apex narrowed (Fig. 58), length of body 6.2 - 7.0 mm, head black, Western Yunnan .....*L. (Weiyangia) taliensis* sp.n.
- 4 Male antennal segment 3 with short lamella (subgenus *Lyponia*, the *debilis* group)5
- Male antennal segment 3 without any lamella .....9
- 5 Lamella of male antennal segment 9 is 2.25 to 2.70× longer than trunk of segment 6
- Lamella of male antenna segment 9 is 1.0 to 1.3× longer than trunk of segment.....7
- 6 Pronotum reddish brown, disc darker than margins but do distinct border between light and dark areas present, lamella of male antennal segment 9 2.25 to 2.35× longer than trunk of segment, internal sac of male genitalia shorter than phallus (Fig. 63) Japan .....*L. (s.str.) osawai* Nakane
- Pronotum with black patch in middle of pronotum, distinct border between black and red parts of pronotum present, lamella of male antennal segment 9 2.60 to 2.70 longer than trunk of segment, internal sac of male genitalia longer than phallus (Fig. 61) China .....*L. (s.str.) debilis* Waterhouse
- 7 Secondary costae 3 and 4 (counted from suture to margin) shortened, reaching about third of length of elytron, primary costa 2 very stout, apparently elevated in apical third of elytron, pronotum with dark brown patch in the middle and reddish brown margins, phallus slender, slightly curved (Fig. 64). Fukien .....*L. (s.str.) kuatunensis* sp.n.
- Secondary costae 3 and 4 less shortened, reaching at least slightly over half of elytron, primary costa 2 only slightly stouter than costa .....18
- 8 Secondary costae 3 and 4 less shortened, reaching over four fifth of length of elytron, pronotum with black patch in the middle and red margins, sharp border between black and red area present, phallus more slender, slightly curved (Fig. 62) Nepal ....  
.....*L. (s.str.) nepalensis* Nakane
- Secondary costae 3 and 4 more shortened, reaching slightly over half of elytron, primary costa only slightly stouter than costa 1, pronotum testaceous brown, to a certain extent darken in middle, phallus straight, stout (Fig. 66), Japan.....  
.....*L. (s.str.) delicatula* (Kiesenwetter)
- 9 Male antennal segment 3 always nearly parallel-sided, never broadly triangular, with flat elliptical surface covered with dense pubescence (Fig. 36), if flat area not present than the corresponding part of segment 3 covered with more dense pubescence than remaining part of segment, dense pubescence in this case silky brownish, male genitalia with robust short phallus and extremely long internal sac (Figs 68 - 71) or simple without lateral thorns in apical part (Fig. 67, 71) (*Lyponia* s.str., the *nigroscutellaris* group) .....10
- Male antennal segment 3 usually broadly triangular, never with flattened area or area with more dense setae, male genitalia always long, with widened apical part, laterally projected in thorns, internal sac concealed in phallus in retracted position (subgenus *Ponyalis* Fairmaire) .....17
- 10 Only area of silky brownish pubescence present on antennal segment 3, elytra testaceous orange, antennal tubercles light brown, whole pronotum of the same colour as elytra, phallus simple, without long slender internal sac. Northern Burma .....*L. (s.str.) nana* Kleine

- Flat elliptical area with dense pubescence present on antennal segment 3, elytra always red, at least middle of pronotum dark brown to black, phallus short, robust, usually with small lateral thorns in apical part (Figs 68 - 70).....11
- 11 Male antennal segments 4 and 5 serrate or nearly parallel-sided .....12
- Male antennal segments 4 and 5 with short lamellae (Figs 24, 25) .....13
- 12 Male antenna slender and acutely serrate in whole length, Honshu .....  
.....*L. (s.str.) nigroscutellaris nigroscutellaris* Ohbayashi
- Male antenna shortly lamellate from segment 6, Shikoku, Kyushu .....  
.....*L. (s.str.) nigroscutellaris subpectinata* Nakane
- 13 Margins of pronotum bright red, disc black, border between red and black areas apparent, apex of phallus with lateral thorns.....14
- Margins of pronotum testaceous, disc darker, but no sharp border present or whole pronotum dark brown to black, lateral margins of phallus without lateral thorns ..16
- 14 Body 5.7 - 7.2 mm, trunk of male antennal segment 9 1.4× longer than lamella ....15
- Body 8.8 - 10.3 mm, lamella of male antennal segment 9 1.2× longer than ..trunk of segment, western Sichuan .....*L. (s.str.) gongashanica* sp.n.
- 15 Hind margin of pronotum red, primary costae stouter in humeral part only, primary costae in apical part nearly equal. Yunnan..... *L. (s.str.) minuta* sp.n.
- Hind margin of pronotum black, primary costae 2 and 4 much stouter than remaining in apical part of elytron. Hubei .....*L. (s.str.) shennongjiensis* sp.n.
- 16 Lateral margins of pronotum testaceous and disc dark brown or whole pronotum brownish black, male genitalia as fig. 67, Taiwan.....*L. (s.str.) palpalis* Nakane
- Whole pronotum always dark brown to black, male genitalia as fig. 71 Taiwan .....  
.....*L. (s.str.) kleinei* Nakane
- 17 Male antennal segment 4 with lamella at least twice longer than trunk of segment, lamella attached in middle of length of segment (the *dolosa* group) .....18
- Male antennal segment 4 triangular or with short lamella attached at apex of segment .....19
- 18 Male antennal segment 3 as in Fig. 27, body more slender, elytra and margins of pronotum red, primary costae much stouter than secondary ones, Fukien .....  
.....*L. (Ponyalis) fukiensis* sp.n.
- Male antennal segment 3 as in Fig. 29, body broader, elytra and margins of pronotum orange red, primary costae only moderately stouter than secondary ones.Taiwan .....  
.....*L. (Ponyalis) dolosa* Kleine
- 19 Male antennal segment 1 globular, elytra cells of irregular shape, mostly squared 20
- Male antennal segment 1 flattened (Fig. 40, 41, 48), if flat area less apparent than elytra with at least partly black humeri, elytral suture and lateral margins, elytral cells transversal .....21
- 20 Pronotum black, male antenna segment 9 with lamella 2.3× longer than trunk, central Sichuan .....*L. (Ponyalis) tryznai* sp.n.
- Pronotum with bright red margins, male antenna segment 9 with lamella 1.45× longer than trunk, Western Sichuan .....*L. (Ponyalis) sichuanensis* sp.n.
- 21 At least part of frontal margin of pronotum of same colour as elytra (in *L. ishigakiana* Nak. the extent of lighter part is very variable but at least some part of frontal margin



- is lighter) .....27
- Pronotum black (some specimens of *L. quadricollis* Kiesw. have lateral margins of pronotum lighter brown, but this lighter part is never adjacent to the frontal margin) .....22
- 22 Elytra with at least partly black humeri, elytral suture and lateral margins, male genitalia with very obtuse thorns at apex and gradually narrowed apical part (Fig. 79), Kansu .....***L. (Ponyalis) nigrohumeralis* Pic**
- Whole elytra orange red or brownish red, apical part of phallus with sharp thorns at apex and widely cut apex, sometimes with narrower projection in the middle (Figs 73 - 81).....23
- 23 Male antennal segment 6 lamellate, lamella 1.9 to 2.1× longer than trunk .....24
- Male antennal segment 6 acutely triangulate to shortly lamellate, lamella 1.2 - 1.25× longer than trunk .....26
- 24 Elytra broader, orange red, primary costae as strong as secondary ones, Taiwan .....***L. (Ponyalis) gestroi* (Pic)**
- Elytra less widened backwards, red to brownish red, primary costae apparently stouter than secondary ones, Japan .....25
- 25 Apical margin of phallus slightly projected forwards (Fig. 91, 92). Japan.....***L. (Ponyalis) quadricollis* (Kiesenwetter)**
- Apical margin of phallus nearly straight (Fig. 77). China.....***L. (Ponyalis) klapperichi* sp.n.**
- 26 Lamellae of subapical segments of male antenna with slender lamellae, trunk of segment 8 2.8× longer than lamella width in middle, Amami-Oshima Isl .....***L. (Ponyalis) oshimana* Nakane**
- Lamellae of subapical segments of male antenna with broader lamellae, tapering gradually apex, trunk of segment 8 1.9× longer than lamella width in middle, Vietnam ***L. (Ponyalis) alternata* Pic**
- 27 Elytra 5.5 to 6.0× longer than pronotum, phallus nearly parallel-sided, apical part as in fig. 72, eastern China .....***L. (Ponyalis) gracilis* sp.n.**
- Elytra at most 5.0× longer than pronotum, phallus with sharp thorn at apex .....28
- 28 Primary costae much stouter than secondary ones in whole length of elytra, lighter part of pronotum apparently more brownish compared with colour of elytra, without sharp border between dark and light part. Eastern China, Ishigaki Is.....***L. (Ponyalis) ishigakiana* Nakane**
- Primary and secondary costae of the same strength or only very slightly different, pronotum completely red or sharply bordered black patch present, than margins of the same colour as pronotum .....29
- 29 Pronotum with extensive black patch in the middle, broadly attached to basal margin of pronotum and usually narrowly connected to frontal one (frontal connection occurs in about 80 per cent of specimen studied), pronotum narrower, elytra at humeri about 1.5× wider than pronotum, Vietnam, Yunnan, south eastern China .....***L. (Ponyalis) laticornis* (Fairmaire)**
- Whole pronotum of the same colour as elytra or limited dark brown to black patch in middle present, patch never connected with basal margin of pronotum, pronotum



broad, lateral margins slightly concave, humeral width of elytra 1.2 to 1.3× wider than pronotum, primary and secondary costae equal or nearly equal in strength. Darjeeling, northern Burma, Thailand, Laos, Vietnam, southern Yunnan .....  
 .....*L. (Ponyalis) himalejica* Bourgeois

### ***Lyponia Weiyangia* subg.n.**

**Type species.** *Lyponia (Weiyangia) brevicollis* FAIRMAIRE, 1889. **Name derivation.** Gender: feminine, derived from the personal name Wei Chao Yang.

**Diagnosis.** Antennae of both sexes filiform to slightly compressed (Figs 21 - 23), never lamellate or serrate, phallus simple, with more or less conspicuous constriction at middle of length (Figs 56 - 58).

**Description.** see the description of *L. (Weiyangia) brevicollis* Fairmaire, 1889.

**Remarks.** The members of the subgenus *Weiyangia* subg.n. share some very primitive characters (filiform antennae, slender body with narrow pronotum, distinguished primary and secondary costae). The only apomorphy showing close relationship among the species *L. brevicollis* Fairm., *L. taliensis* sp.n. and *L. pertica* sp.n. is constriction in middle part of phallus which is very apparent in the first two listed species and only slightly marked in *L. pertica* sp.n. The synapomorphies of the genus *Lyponia* Wat. mentioned in the chapter Phylogeny are fully developed in all members of the subgenus *Weiyangia* subg.n.

**Distribution.** All representatives have been collected in western Yunnan and western Sichuan only. There is no locality on which two or more species have been collected yet and their distribution seems to be probably completely vicariant.

### ***Lyponia (Weiyangia) brevicollis* Fairmaire**

Figs 22, 56

*Lyponia brevicollis* FAIRMAIRE, 1889: 37. **Lectotype**, ♀ (hereby designated): Moupine (MP).

**Additional material examined.** 1♂, China, Sichuan, Mt. Emei, 600 - 1000 m, 5. - 19. v. 1989 (LMB).

**Diagnosis.** Easily separable from the remaining species of the subgenus *Weiyangia* by the shape of the phallus (Fig. 56).

**Description.** Body small, slender, dark brown to black, head lighter, only antennal tubercles brown, elytra and margins of pronotum cinnabar red. Head small, shining, covered with brown pubescence, antennal tubercles and transversal depression present, antennae reach nearly three quarters of length of elytra, segment 1 globular, segments 3 and 4 slightly compressed, following segments gradually narrower and less compressed, apical segments slim. Pronotum flat, slightly wider than long, no sharp border between black patch and red margins present, covered with brown pubescence, patch not connected with basal margin, apex of scutellum very slightly emarginate. Elytra widest in apical third, all primary costae stouter than secondary ones in whole length, transversal costae irregular, mostly squared. Male genitalia simple, apparently constricted in middle (Fig. 56).

Measurements: Length 9.0 - 9.9 mm, width at humeri 2.30 - 2.65 mm, pronotum L/W (length/width): 1.25 - 1.45 / 1.70 - 2.15 mm.

**Distribution.** Known only from mountains of western Sichuan, toward south replaced by vicariant species *L. pertica* sp.n.

***Lyponia (Weiyangia) pertica* sp.n.**

Figs 21, 57, 84, 87

**Holotype**, ♂: China, Sichuan, Liziping, near Shimien, 200 km SW of Ya'an, 27. vi. - 3. vii. 1991 (LMB); **Paratypes**: 2♂♂, same locality data (LMB); 5♂, 6♀ China, Yunnan, Yulongshan, 3300 - 3900 m, different data of collecting (LMB); China, Yunnan, Weibaoshan, 2800 - 3000 m, 25. - 28. vi. 1992 (LMB); 1♀, Yunnan, Jizu Mts., 2800 m, 30. v. - 3. vi. 1993, Bolm lgt. (LMB, NHMB, NRMS).

**Etymology.** The specific name is derived from "pertica", a Latin name for a staff, referring to the shape of the male genitalia.

**Diagnosis.** *L. pertica* sp.n. differs from other species in the subgenus in the shape of phallus.

**Description.** Body small to medium-sized, black, elytra and margins of pronotum cinnabar red. Head small, shining, covered with sparse black pubescence, tubercles and transverse depression present, antennae filiform, segments 3 and 4 slightly compressed, apical ones slim. Pronotum flat, slightly wider than long, middle patch not connected with basal margin, middle part shining, covered with black pubescence, sharp border between black patch and red margin present. Scutellum slightly emarginate at apex. Elytra slightly widened backwards, primary costae stouter than secondary ones in humeral part but difference much smaller in apical ones. Male genitalia simple (Fig. 57).

Measurements: Length 7.8 - 10.8 mm, width at humeri 2.02 - 2.78 mm, pronotum L/W: 1.23 - 1.65 / 1.69 - 2.16 mm.

**Distribution.** Widely distributed in southern Sichuan and western Yunnan, vicariant with closely relative species *L. brevicollis* Fairm. In Yunnan it occurs in mountain forests up to elevation 3900m a. s. l. (Yulong Shan).

***Lyponia (Weiyangia) taliensis* sp.n.**

Figs 23, 58

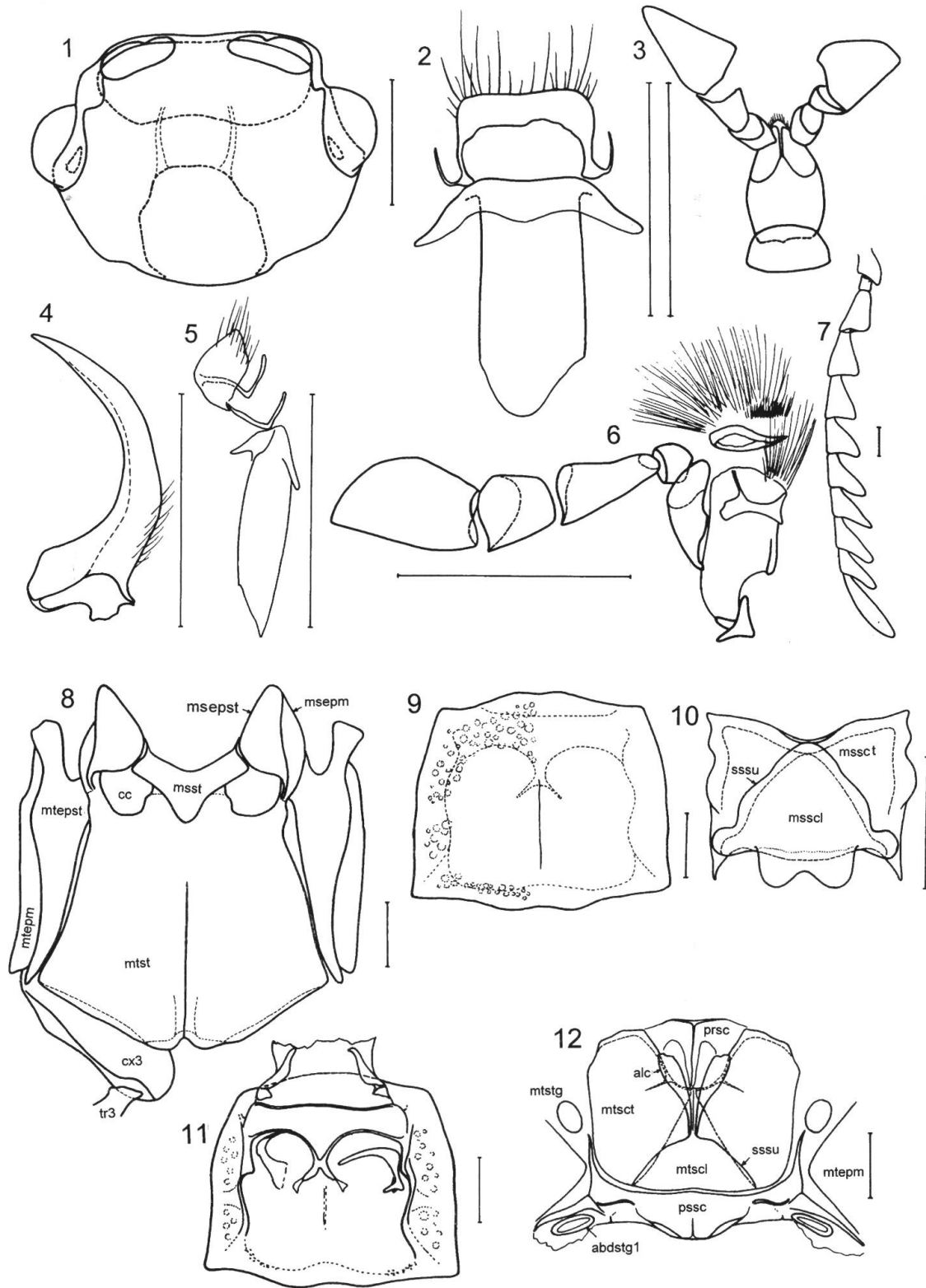
**Holotype**, ♂: China, Yunnan, Dali, Cangshan mts., 5. vi. 1993, Bolm lgt. (LMB); **Paratypes** 1♂, 3♀, ditto (LMB, NHMB). **Etymology.** A specific name is referring to the typical locality of this species.

**Diagnosis.** *L. taliensis* sp.n. has the smallest body among subgenus *Weiyangia* species, but for the sure identification the comparing of the form of phallus with other representatives is necessary.

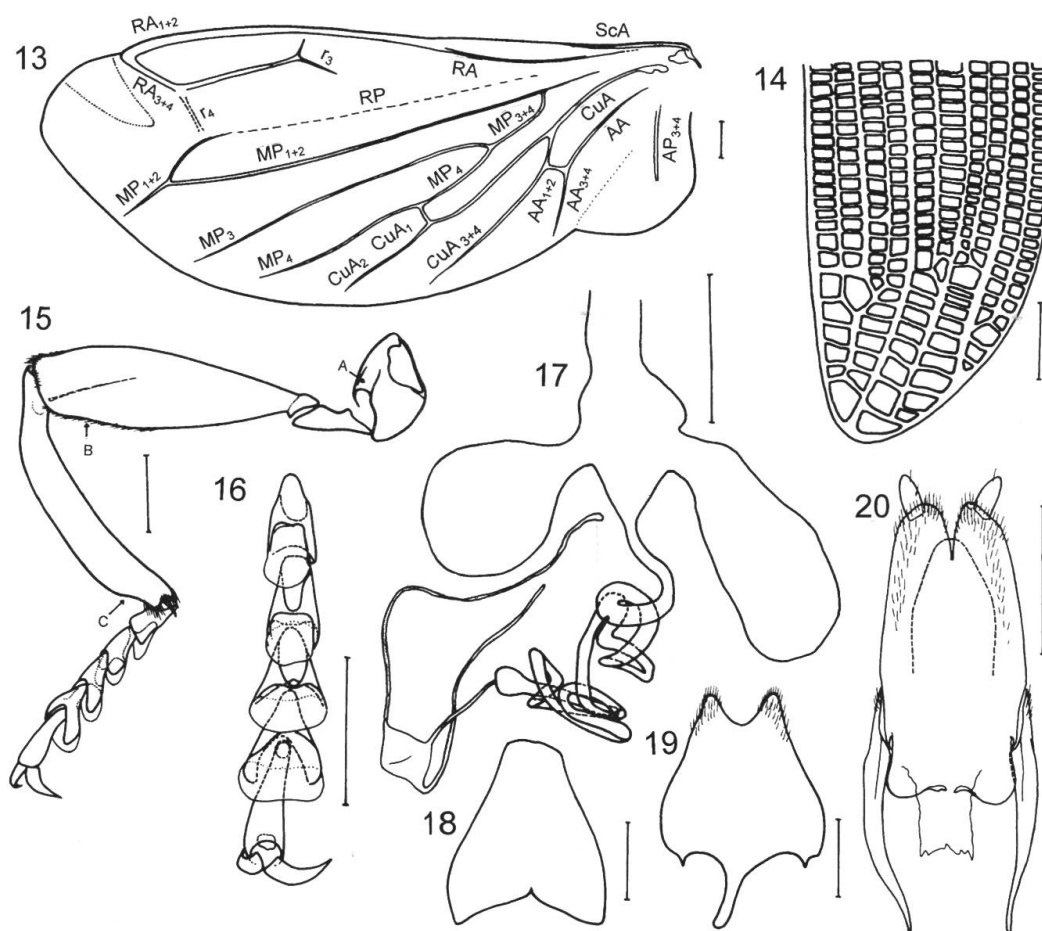
**Description.** Body small, slender, black, only elytra and frontal and lateral margins of pronotum cinnabar red, margins of pronotum lighter than elytra. Head small, shining, covered with sparse brownish pubescence, tubercles and transversal depression present, antennae filiform, reaching slightly behind the middle of elytra, segment 1 globular (Fig. 23), antennae very slightly compressed. Pronotum slightly wider than long, margins straight, middle patch shining, whole pronotum covered with reddish pubescence. Scutellum emarginate, emargination nearly half deep as apex wide. Elytra slightly widened backwards, primary costae apparently stouter in humeral part, difference between primary and secondary ones much slighter in apical half of elytra. Male genitalia simple, slightly curved, without thorns at apex (Fig. 58).

Measurements: Length 6.2 - 7.0 mm, width at humeri 1.83 - 1.96 mm, pronotum L/W: 1.09 - 1.13 / 1.43 - 1.57 mm.

**Distribution.** Known from type locality in western Yunnan only (Cang Shan).



Figs 1 -20: *Lyponia (Ponyalis) klapperichi* sp.n.: 1, cranium. 2, labrum and hypopharynx, dorsal view. 3, labium. 4, mandible. 5, labrum and hypopharynx, lateral view. 6, maxilla. 7, female antenna. 8, mesothorax and metathorax, ventral view. 9, pronotum, dorsal view. 10, mesonotum. 11, pronotum, ventral view. 12, metanotum. Scale 0.5 mm.



Figs 13 - 20: *Lyponia (Ponyalis) klapperichi* sp.n.: 13, wing. 14, apical part of elytron. 15, mesothoracic leg. 16, tarsus. 17, female genitalia. 18, female abdominal tergite 8 (last visible). 19, female abdominal sternite 8. 20, ovipositor. Scale 0.5 mm.

### Subgenus *Lyponia* s.str.

Type species. *Lyponia debilis* WATERHOUSE, 1878

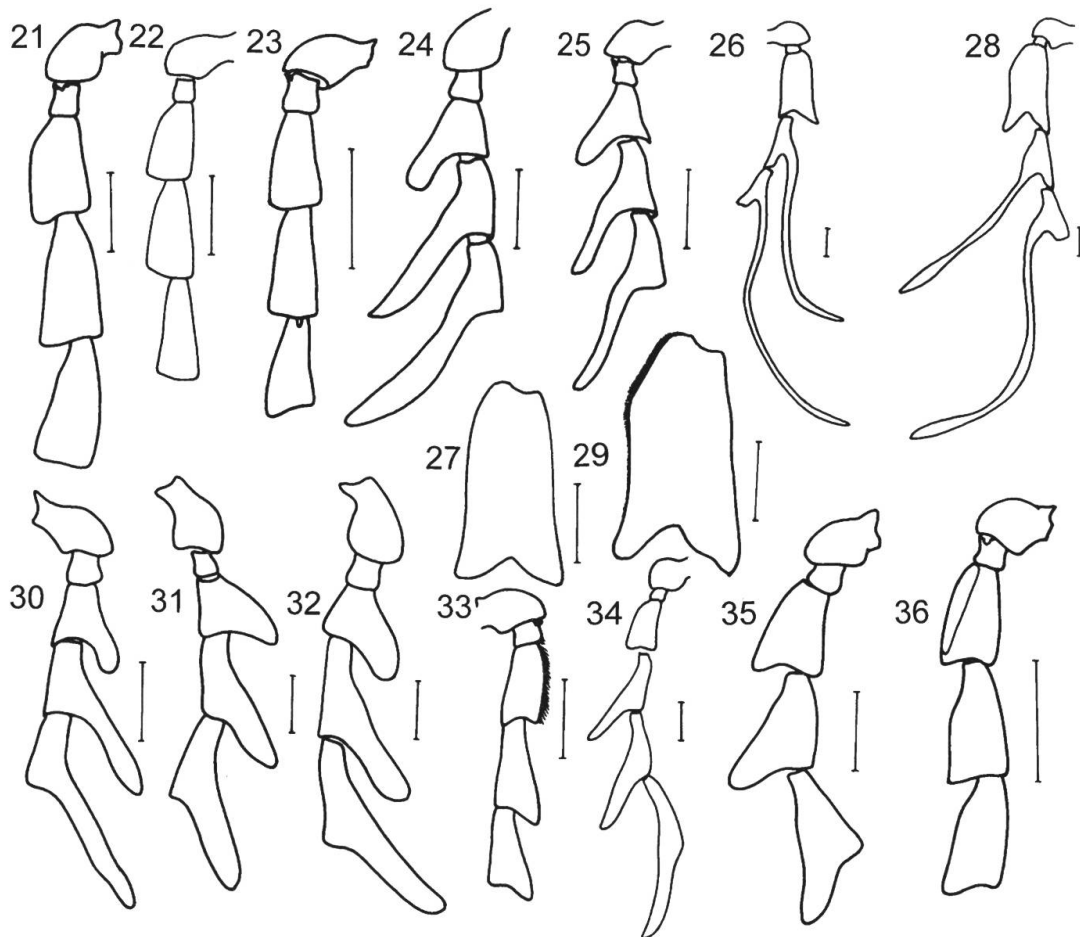
**Apomorphies.** Male genitalia short and stout, without thorns at apex (Figs 61 - 67) or with small thorn subapically and then with extremely long and slender internal sac (Figs 68 - 70), antennae lamellate in male, segment 3 modified, either with short lamella (Figs 24 - 25) or with flat surface (Figs 36).

### The *debilis* group

**Diagnosis.** Male genitalia with straight to slightly curved phallus, without any thorn at apex, internal sac quite slender, usually with dense apparent setae at least in apical half, male antenna with short to moderately long lamellae, male antennal segment 3 with shorter broad lamella.

**Remarks.** Short stout phallus seems to be a synapomorphy of the subgenus *Lyponia* s.str. The modification of the antennal segment 3 is a synapomorphy on the same level but there are no proofs that the lamella of segment 3 is shared exclusively by the

members of the *debilis* group. There is a possibility that another modification which is present in the *nigroscutellaris* group (flat, densely setose surface frontally on segment 3 of male) is the following additive character state connected with the presence of lamella of segment 3 in the *debilis* group. The monophyly of the *debilis* group is supported by the modification of the male fore legs trochanters (character number 15 in the matrix). Based mainly on this character the *debilis* group is considered to be the monophyletic assemblage. For the purpose of practical identification the informal group has been used for this group of related species.



Figs 21 - 36: Male antennal segments: 21, *L. (Weiyangia) pertica* sp.n. 22, *L. (Weiyangia) brevicollis* Fairm. 23, *L. (Weiyangia) taliensis* sp.n. 24, *L. (s.str.) debilis* Wat. 25, *L. (s.str.) delicatula* (Kiesw.). 26, *L. (Ponyalis) fukiensis* sp.n. 27, ditto, segment 3. 28, *L. (Ponyalis) dolosa* Kln. 29, ditto, segment 3. 30, *L. (s.str.) osawai* Nak. 31, *L. (s.str.) kuatunensis* sp.n. 32, *L. (s.str.) nepalensis* Nak. 33, *L. (s.str.) kleinei* Nak. ♀. 34, *L. (s.str.) gongashanica* sp.n. 35, *L. (s.str.) nana* Kln. 36, *L. (s.str.) nigroscutellaris* (Ohb.). Scale 0.5 mm.

### *Lyponia* (s.str.) *debilis* C. O. Waterhouse

Figs 24, 61, 83, 86

*Lyponia debilis* C. O. WATERHOUSE, 1878: 107; **Holotype**, ♂: China, Bowring (BM). Illiger, 1879, Typ. Spec. Coll. p 29; PIC, 1923: 9.

*Lyponia pieli* PIC, 1937: 16. - **syn.n.** Holotype, ♂ (MP): "T'ienmu-Shan, 28. iv. 37, O. Piel coll."

**Additional material examined.** 1♂, 1♀, Fukien, Kuatun (2300 m), J. Klapperich, 18. - 24. iv. 1938 (MAKB); 1♂, 1♀, China, Fukien, Kuatun, 9. - 14. v. 1946, leg. Tschung-Sen (designated by J. R. Winkler as holotype and allotype of *Lyponia klapperichi* sp.n., in litt., NHMB; *L. klapperichi* J. R. Winkler is not an available name in sense of the

Code), 1♂, 1♀, Fukien, Kuatun, 12. iv. 1946 (NHMB, LMB), 1♂, the same locality data, 20. iv. 1946 (SK); 1♀, Fukien, 30. iv. 1946, Klapperich (SK); 2♂, E Guizhou, Xijiang, Leigongshan, 29. -v. -1. vi. 1997, Bolm lgt. (LMB).

**Diagnosis.** The robust phallus of a simple form combined with the structure of elytral costae are the main characters separating *L. debilis* Wat. from other members of the *debilis* group. It differs externally from *L. delicatula* Kiesw. in the coloration of pronotum.

**Description.** Body medium-sized, dark brown, elytra and margins of pronotum red. Head small, antennal tubercles less prominent, transversal depression present, antennae reach two thirds of length of elytra, segment 3 with short lamella (Fig. 24). Pronotum small, frontal angles rounded, posterior ones nearly rectangular, middle patch not attached to basal margin, disc shining, covered with brownish pubescence. Scutellum slightly emarginate at apex. Elytra nearly parallel, primary costae apparently stouter than secondary ones in humeral half of elytra, costa 3 well developed in two thirds of length of elytra only. Male genitalia short and simple, with long quite robust internal sac (Fig. 61).

Measurements: Length 8.5 - 10.1 mm, width at humeri 2.42 - 3.12 mm, pronotum L/W: 1.32 - 1.56 / 1.87 - 2.06 mm.

**Distribution.** Widely distributed species known from Chinese coast (Fukien) to mountains areas of eastern Guizhou.

***Lyponia* (s.str.) *kuatunensis* sp.n.**

Figs 31, 64

**Holotype**, ♂: Fukien, Kuatun (2300 m), J. Klapperich, 8. iv. 1938 (MAKB). **Paratype**: 1♂, Fukien, Klapperich, 2. v. 1946 (SK). **Etymology.** The specific name is referring to the distribution of this species.

**Diagnosis.** The species described here to which it bears the closest affinity is *L. debilis* from which it is distinguishable by the structure of extraordinary stout primary costa 2 and very shortened primary costa 3. The quite slender phallus is another difference utilizable for separating these closely relative species.

**Description.** Body small, dark brown, elytra and pronotum brownish red, pronotum partly infusate in middle. Head small, antennal tubercles unapparent, transversal depression very shallow, antennae reach middle of elytra, with lamellae, antennal segment 3 with short, broad lamella (Fig. 31). Pronotum flat, wider than long, widest at base, lateral margins nearly straight, covered with sparse brownish pubescence, infuscation gradually lighter at margins, scutellum with deep emargination at apex. Elytra parallel-sided, costa 1 stouter than secondary ones only at humeri, of the same strength in middle and apical part, costae 2 and 3 extremely stout and elevated, costa 3 stout at humeri, shortened, reaching at most middle of elytra. Male genitalia simple, curved in basal half, without long internal sac (Fig. 64).

Measurements: Length 7.0 - 7.7 mm, width at humeri 1.82 - 2.02 mm, pronotum L/W: 0.98 - 1.09 / 1.33 1.60 mm.

**Distribution.** Two specimens collected by J. Klapperich in Fukien are known only.

***Lyponia* (s.str.) *nepalensis* Nakane**

Figs 32, 62

*Lyponia nepalensis* NAKANE, 1983: 115 - 123.

**Material examined.** 1♂, Nepal 424, Lalitpur Distr., Phulchoki Mt., 1800 - 2000 m, 25. iv. 1995, Martens and Schawaller (SMNS).



**Diagnosis.** The characteristic shape of male genitalia (Fig. 62), basal antennal segments (Fig. 32), long primary costa 3 and the body coloration are sufficient for sure identification of *L. nepalensis* Nak.

**Description.** Body small, flattened, black, elytra cinnabar red, margins of pronotum brownish red. Head small, antennal tubercles flat, transversal depression very shallow, antennae reach two third of elytral length, segment 3 with short, broad lamella (Fig. 32). Pronotum small, flat, widest at base, frontal angles rounded, frontal margin slightly projected forward, middle patch not attached to basal margin, disc shining, covered with brownish pubescence, lighter area at margins punctuated. Scutellum deeply emarginate at apex. Elytra widest in apical quarter, only primary costae 2 and 4 stouter than secondary ones, difference between them generally small, transversal costae irregular, cells of irregular shape, but mostly squared. Male genitalia simple, without any thorns, slightly curved (Fig. 62).

Measurements: Length 7.15 mm, width at humeri 1.90 mm, pronotum L/W: 1.04 / 1.39 mm.

**Distribution.** Known from the Himalayas only (Nepal).

***Lyponia* (s.str.) *delicatula* (Kiesenwetter)**

Figs 25, 66

*Eros delicatula* KIESENWETTER, 1874: 254.

*Lyponia delicatula*: GORHAM, 1883: 405; KLEINE, 1924: 171; KLEINE, 1926: 98.

**Material examined.** 2♂, Japan, Mt. Takao, 15. v. 1910, 30. v. 1909, Edme Gallois (LMB).

**Diagnosis.** The long lamellae of subapical male antennal segments and the structure of elytral costae are the main external characters separating *L. delicatula* Kiesw. from other members of the subgenus. The very simple and stout phallus is another utilizable distinguishing character. (Fig. 66)

**Description.** Body small, dark brown to black, elytra cinnabar red, pronotum light brown. Head small, shining, covered with long brown pubescence, antennal tubercles flat, transversal depression less apparent, antennae reach behind middle of elytra, antennal segment 3 with short, broad lamella, scutellum slightly emarginate at apex, elytra slightly widened backward, only costae 2 and 4 stouter than secondary ones in middle of elytra. Male genitalia short and broad, without any thorns (Fig. 66).

Measurements: Length 7.3 - 8.5 mm, width at humeri 2.17 - 2.45 mm, pronotum L/W: 1.08 - 1.30 / 1.53 - 1.68 mm.

**Distribution.** Widely distributed in Japan (Honshu, Kyushu, Shikoku)

***Lyponia* (s.str.) *osawai* Nakane**

Figs 30, 63

*Lyponia osawai* NAKANE, 1969: 89 - 92.

**Material examined.** 1♂, Japan, Jikkoku, Ami-macni, Ibaraki Pref., K. Akiyama leg. 21. vi. 1987 (LMB); 1♂, Japan, Mt. Takao, 24. v. 1908, Edme Gallois (LMB).

**Diagnosis.** *Lyponia osawai* is close to *L. kuatunensis* according to unique arrangement of primary elytral costae but a degree of shortening of the costa 3 and strengthening of the costa 2 is apparently lower. The shape of phallus and coloration of the pronotum are good separating characters of these species.

**Description.** Body medium-sized to small, dark brown, elytra brownish red, pronotum light brown. Head small, shining, covered with brown pubescence, antennal tubercles less prominent, transversal depression present, antennae reach slightly behind middle of elytra, with lamellae, antennal segment 3 with short broad lamella. Pronotum flat, darker in middle, disc shining, covered with dense long light brownish pubescence. Scutellum deeply emarginate at apex. Elytra slightly widened backward, flat, primary costa 1 weak, stouter than secondary ones only at humeri, costa 2 and 4 much stouter. Male genitalia simple, without any thorns (Fig. 63).

Measurements: Length 7.55 - 9.15 mm, width at humeri 2.24 - 2.45 mm, pronotum L/W: 1.36 - 1.45 / 1.62 - 1.71 mm.

**Distribution.** Known from Honshu (Japan) only.

### The *nigroscutellaris* group

**Apomorphies.** Segment 3 of male antennae with flat, densely setose area (Figs 36), internal sac always extremely long and slender, always longer than phallus itself (Figs 67 - 71).

**Remarks.** The modification of the male antenna segment 3 is used for definition of this well supported monophyletic group. *Lyponia nana* Kleine is considered to be the most primitive member of this group, because very unapparent flattening is present on antenna only and dense setae are present on the corresponding part of segment. *Lyponia nigroscutellaris nigroscutellaris* Nak. from Honshu is exceptional in the subgenus *Lyponia* s.str. by the nearly filiform male antennae. This character state should be apomorphy and not plesiomorphy shared with *Weiyangia* gen. n. Taking it as plesiomorphy the much more complex structure of male genitalia would change in a parallelism. The presence of short lamellae in subspecies *L. nigroscutellaris subpectinata* Nak. supports this view.

The species *L. gongashanica* sp.n., *L. nigroscutellaris* Ohb., *L. shennongjiensis* sp.n. and *L. minuta* sp.n. share very similar structure of apical part of phallus with small subapical thorns (Figs 68 - 70) and they share also the longest internal sac. These are considered to be the synapomorphies of species listed above but this group was not defined either formally or informally.

### *Lyponia* (s.str.) *nigroscutellaris* (Ohbayashi)

Figs 36, 69

*Plateros nigroscutellaris* OHBAYASHI, 1956: 59

*Lyponia nigroscutellaris*: NAKANE, 1967: 288.

*Lyponia nigroscutellaris subpectinata* NAKANE, 1969: 86.

**Material examined.** 1♂, Japan, Mt. Nati, 5. v. 1952 (NHMB - coll. Frey); 1♀, Japan, Kimori, Daito, Wakayona, 4. v. 1960 (NHMB - coll. Frey) - identified by T. Nakane.

**Diagnosis.** Among species with lateral thorns at the apex of phallus *L. nigroscutellaris* Ohb. is the only species with very limited extension of the red coloured part of pronotum. The missing or respectively the very shortened lamellae of male antennae are the another separating characters.

**Description.** Body small, black to dark brown, only elytra testaceous red, pronotum lighter brown. Head small, shining, covered with long, sparse, brownish pubescence, antennae reach slightly behind middle of elytra, filiform, only middle antennal segments (4th and following) slightly compressed, segment 3 with flat surface (Fig. 36). Pronotum much wider than long, widest at base, posterior angles rectangular, flat, covered with sparse brown pubescence, margins lighter than disc. Scutellum without emargination at apex. Elytra widest at apical quarter, only costae 2 and 4 stouter than secondary ones in apical half of elytra. Male genitalia with very long internal sac (Fig. 69).

Measurements: Length 5.95 - 7.75 mm, width at humeri 1.58 - 2.03 mm, pronotum L/W: 0.90 - 1.48 / 1.43 - 1.71 mm.

**Distribution.** Known from Honshu (Japan) only.

***Lyponia* (s.str.) *minuta* sp.n.**

Figs 60, 70

**Holotype**, ♂: China, Yunnan, Jizu mts., 2800 m, 30. v. - 3. vi. 1993, Bolm lgt. (LMB). **Paratypes**: 1♂, 1♀, the same locality data (LMB).

**Etymology.** A specific name is referring to the size of the body of this species which belongs to the smallest in the genus *Lyponia* Wat.

**Diagnosis.** *L. minuta* sp.n. belongs to the *nigroscutellaris* group and it is mostly closely related to *L. shennongjiensis* sp.n., having the same type of aedeagus and male antennae. Apart from coloration and the length of antennal lamellae it differs principally having nearly the same strength of all primary costae in the apical part elytra. For differences in male genitalia see Figs 68 - 70.

**Description.** Body small, black, elytra cinnabar red, pronotal margins orange red. Head small flat, transversal depression weak, antennal tubercles lighter brown, antennae reach slight behind middle of elytra, with lamellae, lamellae shorter, segment 3 with flat surface (Fig. 60). Pronotum flat, frontal and posterior margin nearly straight, lateral ones slightly constricted behind middle, posterior angles nearly rectangular, disc shining, covered by sparse brownish pubescence, emargination at apex of scutellum very weak. Elytra flat, widest in apical quarter, primary costae apparently stouter in humeral third only. Male genitalia with long internal sac and inconspicuous thorns at apex (Fig. 70).

Measurements: Length 5.8 - 7.0 mm, width at humeri 1.64 - 1.68 mm, pronotum L/W: 0.98 - 1.05 / 1.26 - 1.37 mm.

**Distribution.** Known only from Mt. Jizu in western Yunnan.

***Lyponia* (s.str.) *shennongjiensis* sp.n.**

Figs 93, 94

**Holotype**, ♂: China, Hubei, Shennongjia Nat. Res., E slope of Dashennongjia, 2000 m, 12. - 15. vi. 1997, Bolm lgt. (LMB). **Paratype**: 1♀, China, W Hubei, Shennongjia Co., Yanzi Pass, 31.43/110.28, 2200 m, 23. - 26. vi. 1995 (LMB).

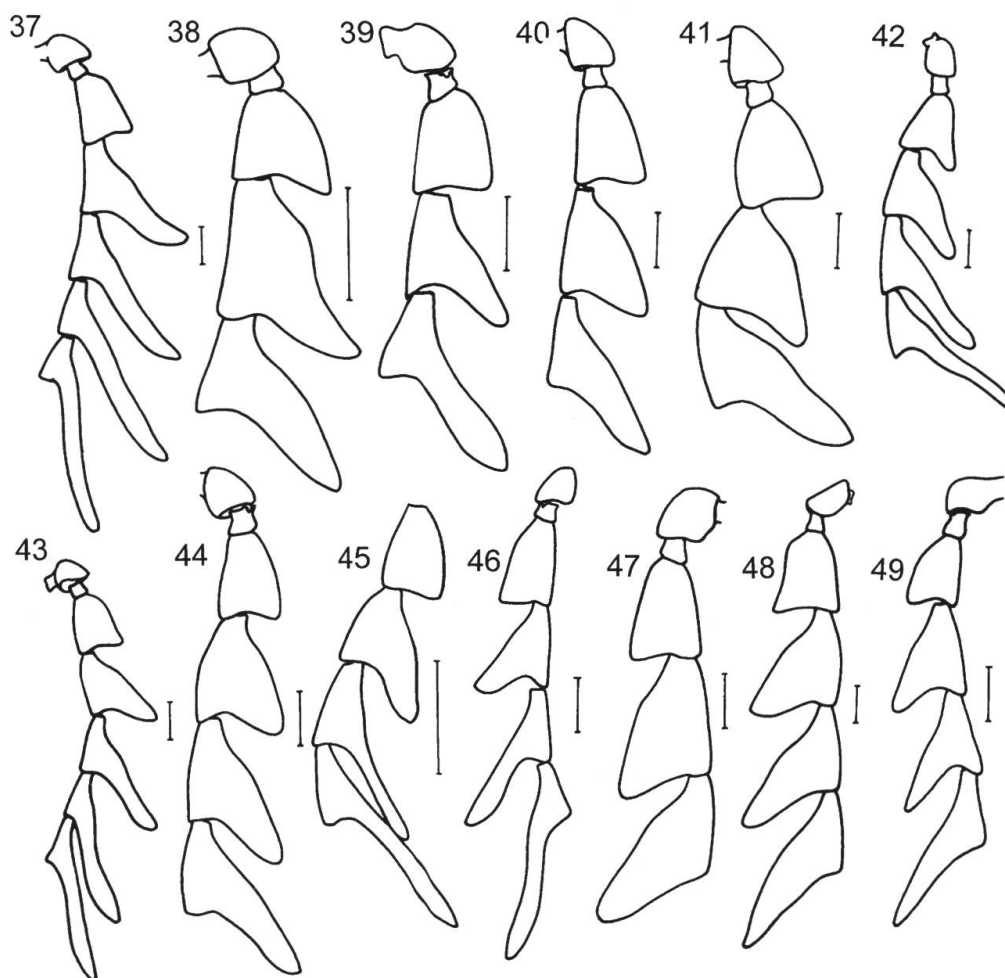
**Etymology.** A specific name is referring to the type locality (Shennongjia county in Western Hubei).

**Diagnosis.** *L. shennongjiensis* sp.n. is a member of the *nigroscutellaris* group and it is very near to *L. minuta* sp.n. especially. It differs from *L. minuta* sp.n. in the extent of black patch on the pronotum (black area is attached to the hind margin of the pronotum) and much stouter primary costae 2 and 4 compared with remaining primary costae. The antennal lamellae are nearly of the same length in both species and also their male genitalia are very similar and do not help in sure identification.

**Description.** Body small, black, elytra cinnabar red, frontal and lateral pronotal margins orange red. Head small, flat, transversal depression weak, antennal tubercles lighter brown, antennae reach slightly behind middle of elytra, with shorter lamellae, segment 3 with flat surface. Pronotum flat, frontal and posterior margin nearly straight, lateral ones slightly constricted behind middle, posterior angles nearly rectangular, disc shining, covered by sparse brownish pubescence, emargination at apex of scutellum very weak. Elytra flat, widest in apical quarter, primary costae 2 and 4 apparently stouter in whole length, remaining primary costae stouter in humeral part only. Male genitalia with long internal sac and inconspicuous thorns at apex.

Measurements: Length 7.5 - 7.7 mm, width at humeri 2.03 - 2.06 mm, pronotum L/W: 1.61 - 1.72 / 1.08 - 1.13 mm.

**Distribution.** *L. shennogjiensis* sp.n. is known only from the mountainous forested area of western Hubei.



Figs 37 - 49: Male antennal segments: 37, *L. (Ponyalis) laticornis* Fairm. 38, *L. (Ponyalis) ishigakiana* Nak. 39, *L. (Ponyalis) tryznai* sp.n. 40, *L. (Ponyalis) gestroi* Pic. 41, *L. (Ponyalis) alternata* Fairm. 42, *L. (Ponyalis) himalejica* Bourg. 43, *L. (Ponyalis) nigrohumeralis* Pic. 44, *L. (Ponyalis) oshimana* Nak. 45, *L. (Ponyalis) himalejica* Bourg. (holotype of *L. ochraceicollis* Pic). 46, *L. (Ponyalis) quadricollis* (Kiesw.). 47, *L. (Ponyalis) laticornis* Fairm. 48, *L. (Ponyalis) himalejica* Bourg. (holotype of *L. robusticollis* Pic). 49, *L. (Ponyalis) sichuanensis* sp.n. Scale 0.5 mm.

***Lyponia* (s.str.) *palpalis* Nakane**

Figs 59, 67

*Lyponia palpalis* NAKANE, 1971: 140.**Material examined.** 1♂ and 1♀, Taiwan, Mt. Rara, 4. v. 1982, A. Yamashita lgt. (KM).

**Diagnosis.** The very specific male genitalia combine a simple form of phallus with an extraordinary long internal, slender sac. *L. palpalis* Nak. differs from all species of the *nigroscutellaris* group known from Asian mainland in the black pronotum.

**Description.** Body small, black to dark brown, only elytra cinnabar red. Head small, antennal tubercles flat, transversal depression nearly inconspicuous, antennae reach two thirds of length of elytra, with lamellae, lamellae at most slightly longer than trunk of segment, segment 3 without lamella, slightly flattened frontally, area of flattening covered with longer dense setae (Fig. 59). Pronotum flat, wider than long, all margins nearly straight. Scutellum only slightly emarginate. Primary costae 2 and 4 stouter in whole length, other primary costae stouter than secondary ones in humeral two thirds. Male genitalia with long, slender internal sac, no thorns present (Fig. 67).

Measurements: Length 6.1 - 8.1 mm, width at humeri 1.68 - 2.10 mm, pronotum L/W: 0.87 - 1.13 / 1.19 - 1.47 mm.

**Distribution.** This species is known from Taiwan only.

***Lyponia* (s.str.) *gongashanica* sp.n.**

Figs 34, 68

**Holotype**, 1♂, China, Sichuan, Gongashan, Moxi, 2. vii. 1992 (LMB). **Paratypes**: 1♂, China, Sichuan, Emei Shan, 2000 - 2400 m (LMB); 1♂, China, Sichuan, Dayi Dafeishui Forest, cca 110 km W of Chengdu, 22. vi. 1993 (LMB); 1♂, W Sichuan, 3. - 6. vii. 1994, Gongashan, Hailuoguo, 2900 - 3000 m (LMB); 1♂, Siao-Lou-Lou-Chan, Chasseurs Thibétains, 1896 (SK); 1♀, Ta-Tsien-Lou, Chasseurs Thibétains, 1896 (SK); 1♀, Chasseurs Thibétains, 1899 (SK).  
**Etymology.** The specific name is referring to the distribution of this species.

**Diagnosis.** *L. gongashanica* sp.n. is very similar with *L. sichuanensis* sp.n. in general appearance, but not closely related to it and belongs to different subgenus. The male genitalia enable sure identification of the relationship. It differs from the species with similar male genitalia (*L. nigroscutellaris* Ohb., *L. shennongjiensis* sp.n. and *L. minuta* sp.n.) in the larger body and the very long lamellae of antennae.

**Description.** Body medium-sized, slender, black, elytra and margins of pronotum cinnabar red. Head small, covered with brown pubescence, antennal tubercles apparent but not extremely prominent, deep transversal depression behind them not present. Antennae reaching two thirds of length of elytra, with lamellae, segment 3 with flat area in frontal view (apparent in fig. 60 - *L. minuta* sp.n., fig. 34 designed in another view). Pronotum flat, covered by reddish brown pubescence, disc shining, margins finely punctuated, Scutellum longer than wide, very slightly emarginate at apex, shining. Elytra slightly widened backwards, primary costae stronger than secondary ones in whole length, but especially in humeral part of elytra. Male genitalia with very long internal sac (fig. 68).

Measurements: Length 8.7 - 10.7 mm, width at humeri 2.13 - 2.72 mm, pronotum L/W: 1.12 - 1.48 / 1.61 - 1.97 mm.

**Distribution.** This species has been found in mountainous areas of western Sichuan. Most specimens of the type series were collected in Picea-Abies forests in elevations over 2000 m a. s. l.

***Lyponia* (s.str.) *kleinei* Nakane**

Figs 33, 71

*Lyponia kleinei* NAKANE, 1967:286; NAKANE, 1971:140; BOCÁK & BOCÁKOVÁ, 1987: 281.**Material examined.** 1♂, Taiwan, Alishan, 2400 m, J. and S. Klapperich leg. (LMB).**Diagnosis.** It differs from the similar *L. palpalis* in the shape of male genitalia (Fig. 71) and from the species of the *nigroscutellaris* group from continental Asia in the colour of pronotum.**Description.** Body small, black, only elytra cinnabar red. Head small, shining, covered with long, sparse, brown pubescence, antennal tubercles flat, less apparent, transversal depression shallow, antennae reach slightly behind middle of elytra, with lamellae, lamellae shorter, antennal segment 1 globular, segment 3 with flattened area, pronotum flat, wider than long, slightly constricted behind middle, whole pronotum shining, covered with sparse, long, brown pubescence, scutellum wide, apparently emarginate at apex. Elytra slightly widened backwards, primary costae slightly stouter than secondary ones in whole length. Male genitalia with long slender internal sac (Fig. 71).

Measurements: Length 8.2 mm, width at humeri 2.27 mm, pronotum L/W: 1.27 / 1.75 mm.

**Distribution.** Known from Taiwan only.***Lyponia* (s.str.) *nana* Kleine**

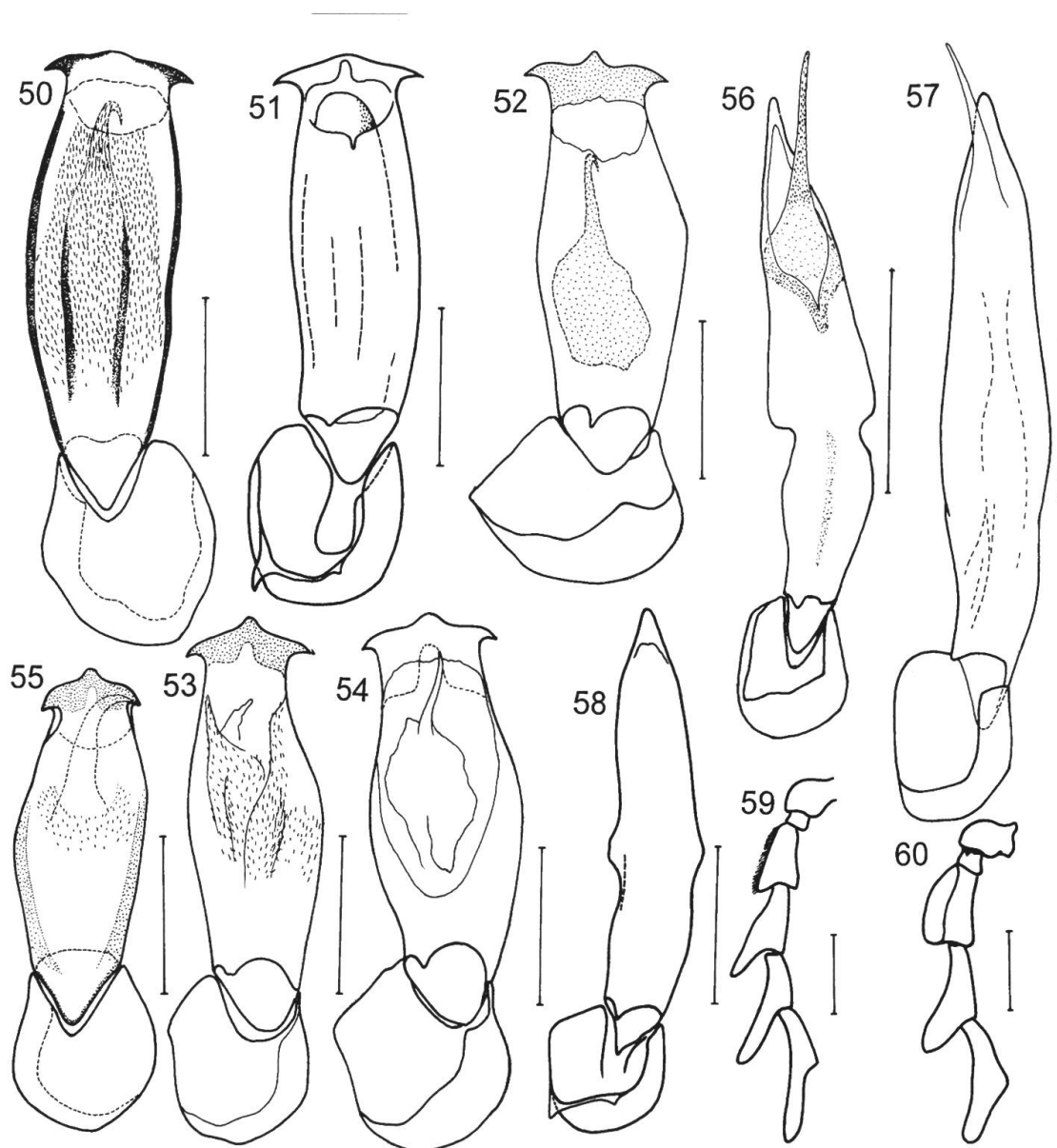
Figs 35, 65

*Lyponia nana* KLEINE, 1939: 18. **Lectotype**, ♂ (hereby designated): N. E. Burma, Kambaiti, 7 000 ft., 25. - 22. 4. 1934, R. Malaise (NRMS). **Paralectotypes**, 1♂, N. E. Burma, Kambaiti, 700 m, 19. iv. 1934, R. Malaise (ZIW); 1♀, ditto, 12. 4. 1934 (NRMS).**Diagnosis.** *L. nana* Kln. is the only species with testaceous to orange coloration of elytra occurring in the continental Asia. The lighter coloration of the antennal tubercles is also exceptional within *Lyponia* Wat.**Description.** Body medium-sized, black, pronotum and elytra testaceous, posterior part of antennal tubercles of the same colour. Head small, shining, covered with long testaceous pubescence, antennal tubercles prominent, depression behind them present, antennae reach two thirds of length of elytra, flabellate, only lamellae of segments 8 to 10 of same length, segment 3 with dense setae in area, where flat surface occurs in other species, flattening very weak. Pronotum much wider than long, flat, widest at base, lateral margins convex, disc shining, whole pronotum with testaceous pubescence. Scutellum parallel, weakly emarginate at apex. Elytra only slightly widened backwards, widest in apical quarter, only costae 2 and 4 stouter than secondary ones in apical half. Male genitalia simple, without long internal sac (Fig. 65).

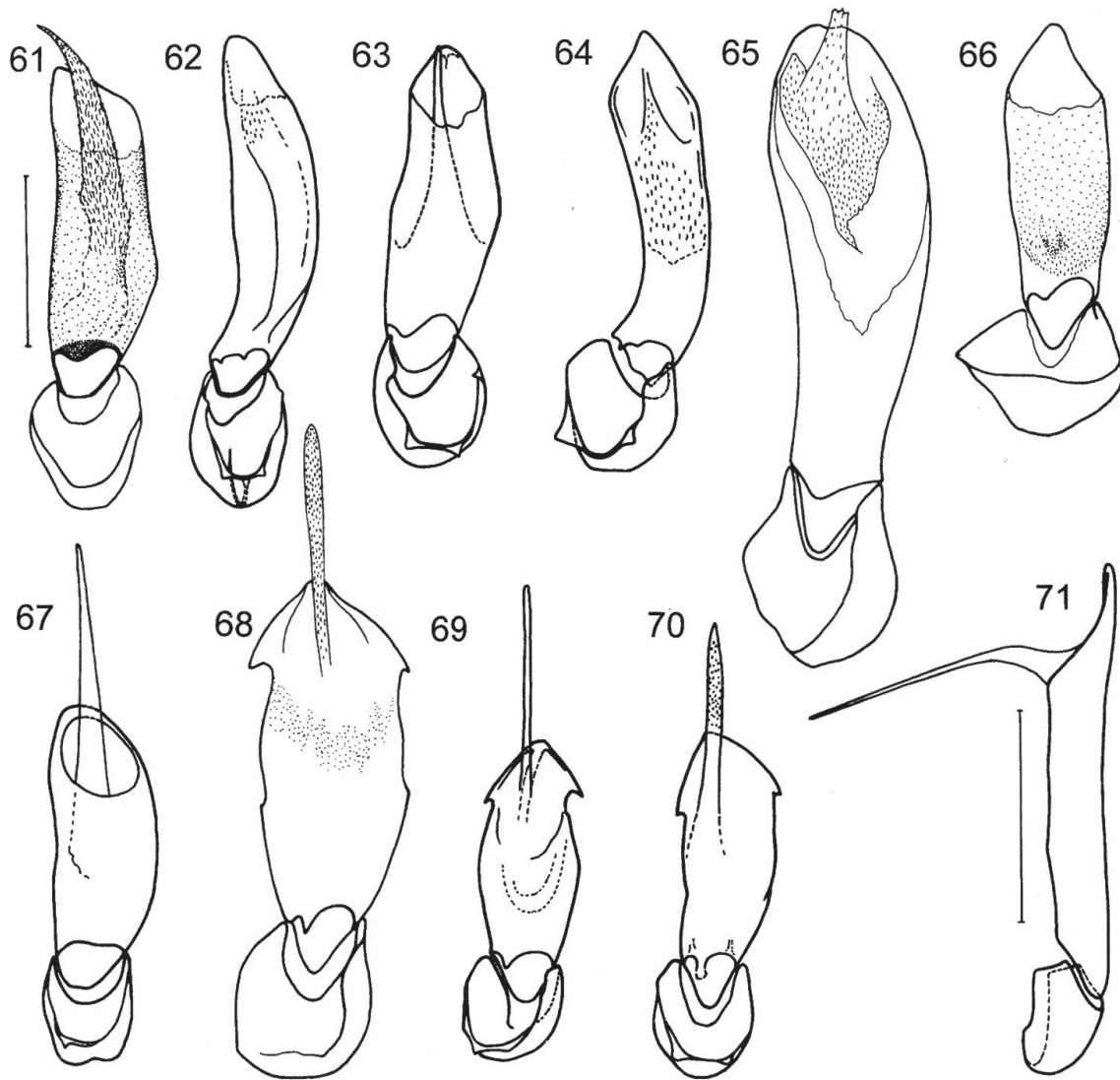
Measurements: Length 9.2 mm, width at humeri 2.35 mm, pronotum L/W: 1.32 / 1.82 mm.

**Distribution.** Known only from the type locality in northern Burma.**Subgenus *Ponyalis* Fairmaire stat.n.***Ponyalis* FAIRMAIRE, 1899: 623. **Type species.** *Ponyalis laticornis* FAIRMAIRE, 1899: 623 (by monotypy).*Lyponia* WATERHOUSE, 1878: PIC, 1926: 69.





Figs 50 - 60: Male genitalia: 50, *L. (Ponyalis) dolosa* Kln. 51, *L. (Ponyalis) fukiensis* sp.n. 52, *L. (Ponyalis) himalejica* Bourg. (spec. det. as *L. waterhousei* Gorh., Mus. Paris). 53, ditto (holotype of *L. ochraceicollis* Pic. 54, ditto (holotype); 55, *L. (Ponyalis) laticornis* Fairm. (holotype of *L. limbaticollis* Pic). 56, *L. (Weiyangia) brevicollis* Fairm. 57, *L. (Weiyangia) pertica* sp.n. 58, *L. (Weiyangia) taliensis* sp.n. Basal antennal segments: 59, *L. (s.str.) palpalis* Nak. 60, *L. (s.str.) minuta* sp.n. Scale 0.5 mm.



Figs 61 - 71: Male genitalia: 61, *L. (s.str.) debilis* Wat. (holotype of *L. pieli* Pic). 62, *L. (s.str.) nepalensis* Nak. 63, *L. (s.str.) osawai* Nak. 64, *L. (s.str.) kuatunensis* sp.n. (holotype). 65, *L. (s.str.) nana* Kln. (paratype). 66, *L. (s.str.) delicatula* (Kiesw.). 67, *L. (s.str.) palpalis* Nak. 68, *L. (s.str.) gongashanica* sp.n. (holotype). 69, *L. (s.str.) nigroscutellaris* (Ohb.). 70, *L. (s.str.) minuta* sp.n. (holotype). 71, *L. (s.str.) kleinei* Nak. Scale 0.5 mm.

**Apomorphies.** Two lateral subapical thorns at apex of phallus, male antennae lamellate from segment 4 or 5, segments 3 to 4 (5) broadly triangular, compressed, without any setose area.

**Remarks.** The subgenus *Ponyalis* Fairm. is based on the structure of male genitalia and male antennae. The structure of phallus is very stable throughout the subgenus. The only observed modification are less sharp thorns in some species (Figs 72, 76, 79). This state seems to be more primitive, because the species in which it occurs do not show some other advanced characters present in remaining species (widened elytra resulting in apparently transverse elytral cells, equalising of primary and secondary costae and widened lateral parts of pronotum).

The genus *Ponyalis* Fairm. has been considered younger synonym of *Lyponia* Wat. since Pic (1912). The new status of subgenus is used in this revision based on characters listed above.

### The *sichuanensis* group

**Remarks.** The species *L. sichuanensis* sp.n., *L. gracilis* sp.n. and *L. ishigakiana* Nak. show many primitive character states compared with the remaining species of the subgenus *Ponyalis* Fairm. Regarding the benefit of separating some apparently monophyletic species groups (the *dolosa* group, the *himalejica* group and the *alternata* group) the above listed species were ordered as most primitive in separate informal species groups. *L. gracilis* sp.n. and *L. ishigakiana* Nak. are very similar and therefore they were united in a separate species group, in spite of lack of an apparent synapomorphy which could be used for an apparent prove of relationship.

### *Lyponia (Ponyalis) sichuanensis* sp.n.

Figs 49, 73

**Holotype**, ♂: China, Sichuan prov., 27. vi. - 3. vii. 1991, Z. Kejval lgt., Liziping env. near Shimien, 200 km SW of Ya'an (LMB). **Paratypes**: 1 ♀, Su-Tchuen, Chaus. Thibétains, 1897 (SK); 2 ♀, China, Sichuan, Liziping, 28. vi. - 3. vii. 1991, R. Dunda lgt. (LMB).

**Etymology.** A specific name is referring to the distribution of this species.

**Diagnosis.** The globular shape of antennal segment 1 combined with body coloration enable sure identification of *L. sichuanensis* sp.n. The slender body shape, especially of male, reminds of *L. gongashanica* sp.n. which is not closely related and belongs to the subgenus *Lyponia* s.str. Both species occurs syntopically in the mountains of south western Sichuan and are not separable in the field.

**Description.** Body medium-sized, slender, black, elytra and margins of pronotum cinnabar red. Head small, shining, densely pubescent, antennal tubercles prominent, rounded, separated by deep groove, transversal depression behind tubercles deep too, eyes small, clypeus emarginate, labrum small, transversal, apical segment of maxillary palpi obliquely cut. Antennae reaching slightly behind middle of elytra, flabellate, lamellae of segments 6 - 10 approximately of same length. Basal segments as fig. 49. Pronotum slightly wider than long (1.15×), flat, margins elevated, black patch in middle of pronotum, not in touch with any margin, black part of disc finely structured, shining,

red margins roughly punctuated, matt. Scutellum flat, longer than wide, very slightly emarginate at apex, shining. Elytra parallel sided, primary costae apparently stronger than secondary ones in whole length. Male genitalia (fig. 73) with thorns at apex.

Measurements: Length 10.9 - 14.0 mm, width at humeri 2.59 - 3.72 mm, pronotum L/W: 1.69 - 2.52 / 1.97 - 2.90 mm.

**Distribution.** *L. sichuanensis* sp.n. is known from mountainous areas of western Sichuan only.

### The *gracilis* group

**Remarks.** The group comprises two species with common body pattern and similar structure of male antennae and elytra.

#### *Lyponia (Ponyalis) gracilis* sp.n.

Figs 72, 88 - 90

**Holotype.** ♂: China, Kuatun (Fukien), 12. iv. 1946 (NHMB), **Paratypes:** the same locality data: 1 ♂ (LMB), Fukien, 23. iv. 1946, 30. iv. 1946, Klapperich, 2 ♀ (SK), Kuatun, 2300m, 27.40N, 117.40E, 8. iv. 1938, J. Klapperich, 1 ♀, ditto, 5. v. 1938, 1 ♂, ditto, 29. iv. 1938, 1 ♀, ditto, 11. v. 1938, 1 ♀, ditto, 14. vi. 1938 1 ♀ (MAKB, LMB).

**Etymology.** *Lyponia gracilis* sp.n. is named according to extraordinary long elytra which give it the appearance of very elongate body.

**Diagnosis.** The long elytra and the shape of male antennae separate *L. gracilis* sp.n. from the relative species externally. The form of the apical part of phallus is very characteristic.

**Description.** Body elongate, black, elytra and margins of pronotum cinnabar red. Head small, transversal depression well developed, antennae reaching middle of elytra, flabellate, segment 1 with very slightly flattened upper surface, segment 4 with very short lamella (fig. 37), lamellae of segments 5 to 10 very long and slender, scutellum slightly emarginate at apex. Pronotum smaller, approximately as long as wide, middle patch reaching frontal and basal margins in the middle, surface of middle patch shining, covered by dense short pubescence, pronotum constricted in basal third, lateral margins consequently "s" shaped. Scutellum slightly emarginate. Elytra remarkably long, primary costae different from secondary ones at humeral area only, transversal costae regular, well apparent, denser in humeral than in apical half. Male genitalia with thorns at apex, but apex projected forwards (Fig. 72).

Measurements: Length 12.2 - 14.5 mm, width at humeri 3.48 - 4.08 mm, pronotum L/W: 2.04 - 2.16 / 2.45 - 2.64 mm.

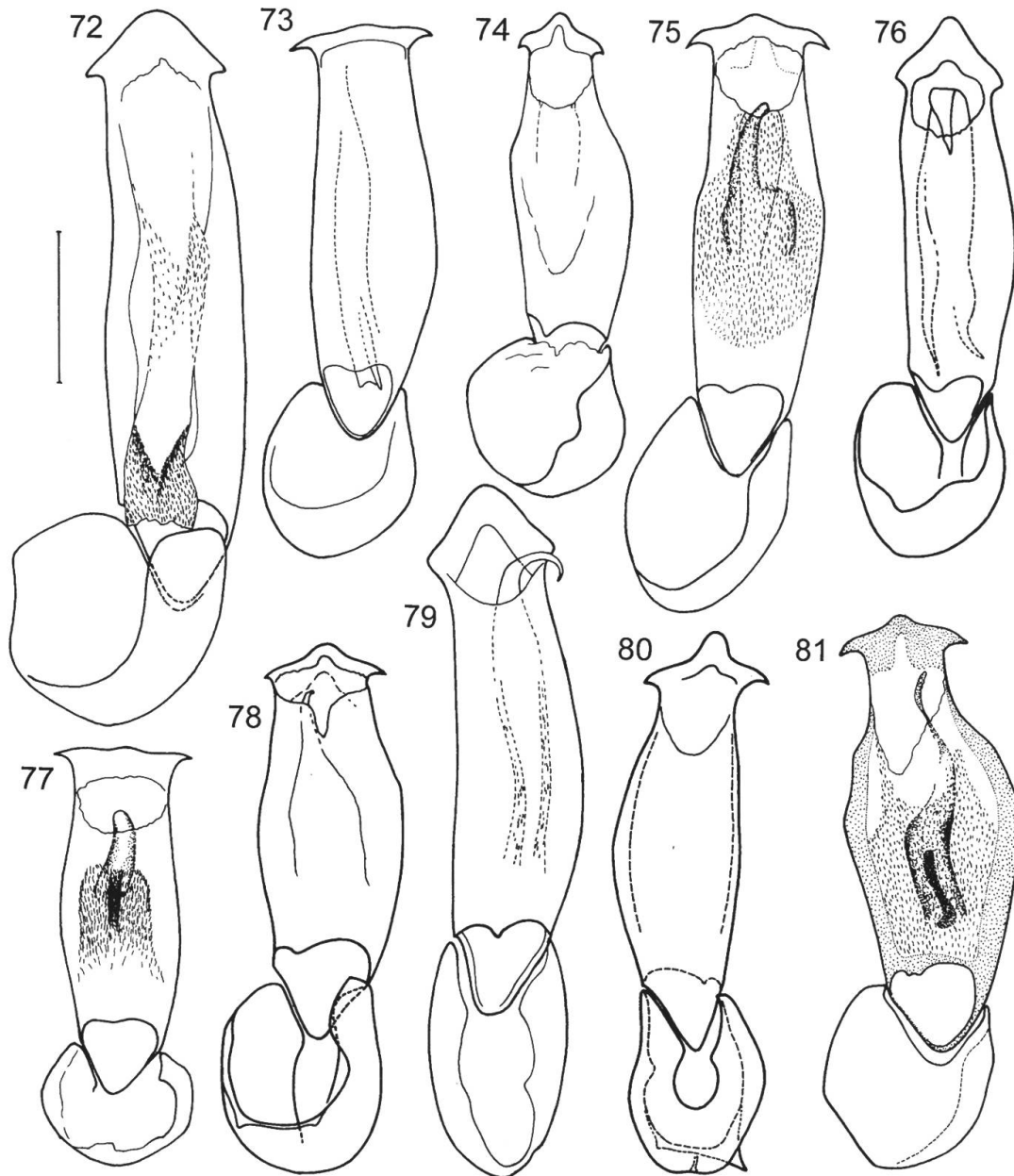
**Distribution.** *L. gracilis* sp.n. is known from Fukien only.

#### *Lyponia (Ponyalis) ishigakiana* Nakane

Figs 38, 74

*Lyponia ishigakiana* NAKANE, 1961: 14.

**Material examined.** 5 ♂, 1 ♀, China, Fukien, Kuatun, 12. iv. - 10. v. 1946 (NHMB, LMB).



Figs 72 - 81: Male genitalia: 72, *L. (Ponyalis) gracilis* sp.n. 73, *L. (Ponyalis) sichuanensis* sp.n. 74, *L. (Ponyalis) ishigakiana* Nak. 75, *L. (Ponyalis) gestroi* Pic. 76, *L. (Ponyalis) tryznai* sp.n. 77, *L. (Ponyalis) klapperichi* sp.n. 78, *L. (Ponyalis) alternata* Pic. 79, *L. (Ponyalis) nigrohumeralis* Pic. 80, *L. (Ponyalis) oshimana* Nak. 81, *L. (Ponyalis) himalejica* Bourg. (holotype of *L. aurantiaca*). Scale 0.5 mm.

**Diagnosis.** *L. ishigakiana* sp.n. differs from the similar *L. quadricollis* (Kiesw.) in much narrower apical part of phallus (Fig. 74) and light brown margins of pronotum.

**Description.** Body medium-sized, black, elytra cinnabar to brownish red, margins of pronotum light brown. Head small, shining, with sparse brownish pubescence, antennal tubercles and transversal depression present, antennae reaching to three fifths of length of elytra, segment 1 with flattened upper surface (Fig. 38), segments 6 to 10 with long,

slender lamellae. pronotum flat, wider than long, disc shining, no sharp border between dark middle part and lighter margins, narrow area at lateral and frontal margin with punctures, scutellum at most slightly emarginate. Elytra nearly parallel, primary costae stouter than secondary ones in whole length, transverse costae sharp, quite dense, elytral cell mostly transverse. Male genitalia apparently narrowed to apex, with lateral thorns (Fig. 74).

Measurements: Length 9.6 - 14.7 mm, width at humeri 2.93 - 4.32 mm, pronotum L/W: 1.56 - 2.21 / 2.09 - 3.07 mm.

**Distribution.** Known from Loochoo islands, now for the first time reported from Fukien, where this species occurs sympatrically with very common species *L. klapperichi* sp.n.

### The *dolosa* group

**Apomorphies.** Extremely long lamellae of male antennae, already lamella of segment 4 extremely long.

**Remarks.** This group comprises two very closely relative species *L. dolosa* Kln. and *L. fukiensis* sp.n. Considering them to be the sister species this group is monophyletic and based on characters given above.

### *Lyponia (Ponyalis) dolosa* Kleine

Figs 28 - 29, 50

*Lyponia dolosa* Kleine, 1924: 173; Kleine, 1926: 98. **Paratype**, 1♂: Formosa, Hozan, iii. 1910, H. Sauter S. G. (ZIW).

**Diagnosis.** It differs from all known *Lyponia* species but *L. kuatunensis* sp.n. in the length of antennal lamellae. The shape of antennal segment 3 enables the sure separation of these very close species (Fig. 27, 29).

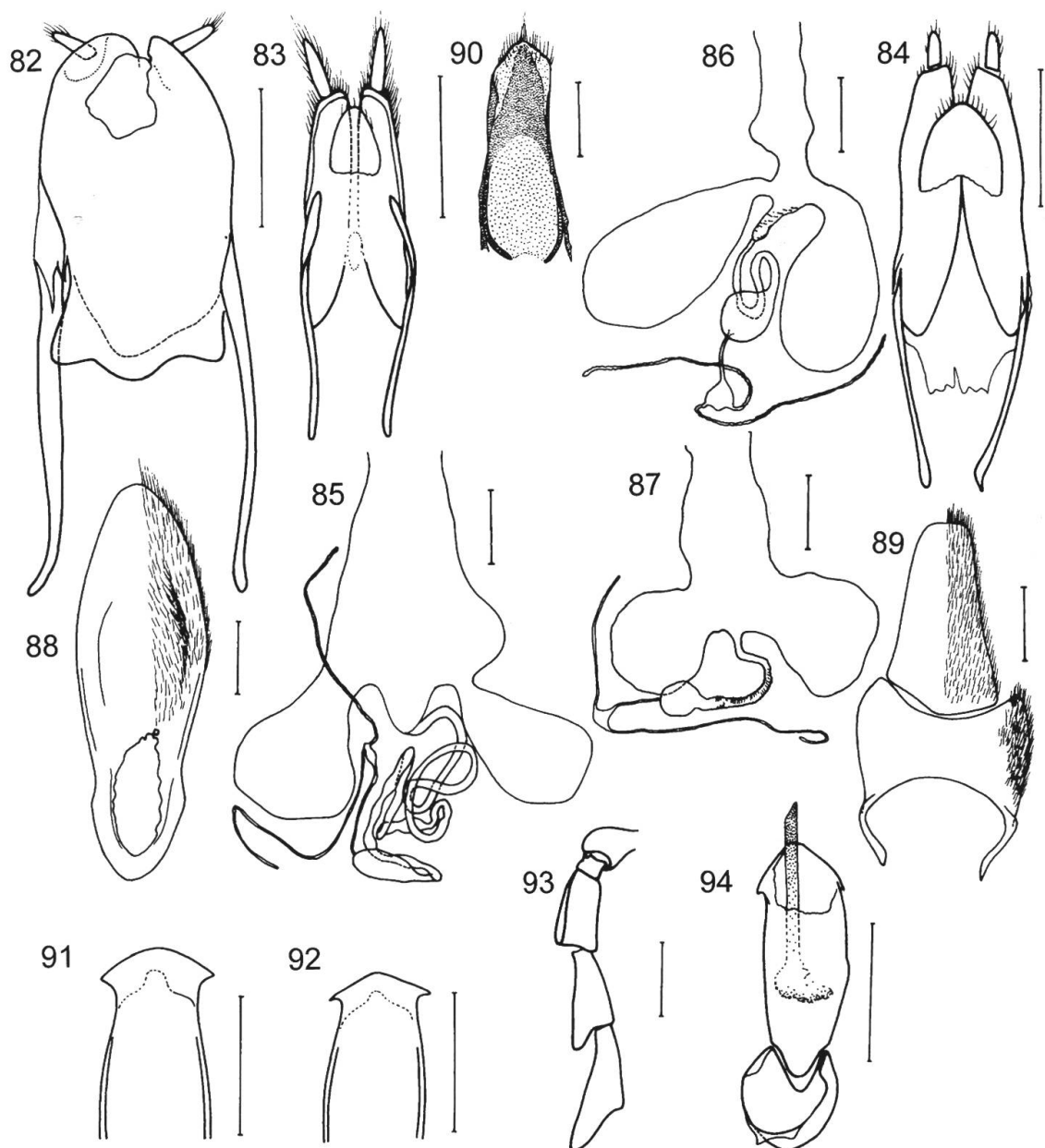
**Description.** Body robust, black to dark brown, only elytra and margins of pronotum orange. Antennal tubercles light brown. Head small, antennal tubercles and transversal depression present, antennae reaching five sixths of length of elytra, with lamellae, segment 3 widest at apex (Figs 28, 29). Pronotum flat, middle patch reach less than one quarter of surface of pronotum, light brown, gradually lighter to margins, disc with brownish pubescence. Scutellum slightly emarginate at apex. Elytra slightly widened backward, primary costae 1 and 3 of nearly the same strength as secondary ones in apical half of elytra, primary costae 2 and 4 stouter. Male genitalia robust, with apical thorns (Fig. 50).

Measurements: Length 12.8 mm, width at humeri 3.19 mm, pronotum L/W: 1.8 / 2.4 mm.

**Remarks.** The shade of the red coloration of *Lyponia fukiensis* sp.n. does not differ from that of the continental species of this genus. Apparently very close *Lyponia dolosa* Kln. from Taiwan has light parts of body nearly orange. The orange coloured species from the genus *Cautires* Wat. are known from Taiwan and they do not occur in the continental part of China. *L. dolosa* is probably involved in some Muellierian mimicry complex.

**Distribution.** Known from Taiwan, where widely distributed. Kleine (1929) cited this species from Sikkim. I have not seen any specimen outside of Taiwan.





Figs 82 - 94: Ovipositor: 82, *L. (Ponyalis) laticornis* Fairm. 83, *L. (s.str.) debilis* Wat. 84, *L. (Weiyangia) pertica* sp.n. Female genitalia: 85, *L. (Ponyalis) laticornis* Fairm. 86, *L. (s.str.) debilis* Wat. 87, *L. (Weiyangia) pertica* sp.n. Terminal abdominal segments of *Lyponia gracilis* sp.n.: 88, sternite 9. 89, tergite 8 and 9. 90, sternite 10. Apical part of phallus: 91, 92, *L. (Ponyalis) quadricollis* (Kiesw.). 93, *Lyponia shennongjiensis* sp.n., male antenna. 94, *L. shennongjiensis* sp.n., male genitalia. Scale 0.5 mm.

***Lyponia (Ponyalis) fukiensis* sp.n.**

Figs 26 - 27, 51

**Holotype**, ♂: Fukien, Kuatun (2300 m), J. Klapperich, 2. iv. 1938 (MAKB). **Paratypes**: 3♂, 2♀, the same locality data, 31. iii. - 28. iv. 1938 (MAKB, LMB); 1♂, Fukien, Klapperich, 2. v. 1946 (NHMB).

**Etymology**. A specific name is referring to the distribution of this species.

**Diagnosis.** *L. fukiensis* sp.n. is very near to *L. dolosa* Kln. They differ in the shape of antennal segment 3 (Figs 27, 29).

**Description.** Body medium-sized, slender, slightly widened backward, dark brown to black, only elytra and margins of pronotum cinnabar red. Head small, antennal tubercles sharply prominent, deep depression behind them present, antennae reaching three quarter of length of elytra, with lamellae, segment 1 nearly globular, only very slightly flattened from above, segment 3 parallel-sided (Fig. 27), segments 3 to 10 with extremely long lamellae (Fig. 26). Pronotum flat, slightly wider than long, posterior angles slightly projected, disc black, shining, covered with brownish pubescence, no sharp border between dark and red areas. Scutellum apparently emarginate at apex. Elytra with four strong primary costae, apparently stronger than secondary ones in whole length. Male genitalia with thorns at apex (Fig. 51).

Measurements: Length 9.5 - 12.0 mm, width at humeri 2.47 - 2.81 mm, pronotum L/W: 1.32 - 1.58 / 1.75 - 2.02 mm.

**Distribution.** Known only from Fukien, vicariant with closely relative *L. dolosa* Kln. which is endemic to Taiwan.

### The *himalejica* group

**Apomorphies.** Widened lateral margins of pronotum, widened elytra, extremely long spermathecal duct.

**Remarks.** The common tendency of equalising of primary and secondary costae is observed in the *himalejica* group and the *laticornis* group.

### *Lyponia (Ponyalis) laticornis* Fairmaire

Figs 37, 55, 82, 85

*Ponyalis laticornis* FAIRMAIRE, 1899: 623. **Holotype**, ♂: Kuatain, Deloton, Chine (MP)

*Lyponia laticornis* FAIRMAIRE, 1899: PIC, 1926: 69.

*Lyponia limbaticollis* PIC, 1926: 70 - **syn.n.** **Holotype**, ♂: "Chapa" (MP)

*Lyponia patruelis* KLEINE, 1939: 17 - **syn.n.** **Lectotype**, ♂ (hereby designated): Burma N. E., Kambaiti, 7 000 ft., 8. - 12. 4. 1934, R. Malaise (NRMS); 1 ♂, N. E. Burma, Kambaiti, 700 m, 16. iv. 1934, R. Malaise (**paralectotype** of *Lyponia patruelis* Kleine, 1939, **paratype** No. 618, ZIW).

**Additional material examined.** 1 ♀, China, Yunnan, Yulongshan, 2600 m, 30.vi.- 2.vii.1990; 1 ♀, ditto, 3200 m, 23.- 24.vi.1993; 2 ♀, ditto, 2400 m, 27.- 28.vii.1990 (all LMB); 4 ♂ China, Yunnan, Weibaoshan, 2800 m, 22.- 25.vi.1992 (LMB); China, Yunnan, Jizu Shan, 2800 m, 30.v.- 3.vi.1993 (LMB); China, Yunnan, Gaoligong mts., 2200 - 2500 m, 16.v.1995 (LMB); 1 ♀, Vietnam, Yen Bai, Hoang Lien Son Distr., Jan Horák lgt., 10.- 11.v.1990 (LMB); 1 ♀, Vietnam, Bao-Ha, prov. Yen Bai, 4.- 12.iv.1962, A. Warchalowski lgt. (SK); Vietnam, Sa Pa, Hoang Lien Son Distr., Jan Horák lgt., 11.- 16.v.1990 (LMB); 1 ♂, Haut-Tonkin, Laokay, Vitalis de Salvaza, A. Vuilet 1920 (SK); 1 ♂ and 1 ♀, Vietnam, Chapa (SK); 1 ♂, E Guizhou, Xijiang, Leigongshan, 29.v.-1.vi.1997, Bolm lgt. (LMB).

**Diagnosis.** The extensive black patch attached to the basal margin of pronotum and sharply separated from the red coloured part of elytra is characteristic for *L. laticornis* Fairm.

**Description.** Body robust, black, elytra and lateral margins of pronotum red to orange red, black patch on disc of pronotum always widely attached to basal margin, in all specimens studied attached also to frontal ones, at least very narrowly. Head small, shining, covered with brownish pubescence, antennal tubercles quite flat, transversal depression conspicuous, antennae reach over middle of length of elytra, with lamellae, segments 3 and 4 nearly triangular (Fig. 47), segments 6 to 10 with long pointed lamellae. Pronotum at most slightly wider than long, usually constricted behind middle,

lateral margins never concave, disc shining, scutellum only slightly emarginate. Elytra nearly parallel-sided, very slight difference in strength of primary and secondary costae present, transversal costae dense and regular, elytral cells transverse.

Measurements: Length 9.9 - 14.2 mm, width at humeri 3.02 - 4.08 mm, pronotum L/W: 1.66 - 2.50 / 2.35 - 3.22 mm.

**Remarks.** The Yunnanese specimens slightly differ in the average length of antennal lamellae of segments 6 to 10. But I have found some specimens collected in Yunnan which have the lamellae nearly as long as specimens from Tonkin. Only one specimens from area between Tonkin and western Yunnan is at my disposal at this moment and it has longer antennal lamellae and I can not check the variability of this character. The shade of red colour change with the elevation of the locality. The coloration of the specimens from higher elevations is dark cinnabar, the specimens from lower areas are more orange. The very similar variability has been found in the series of *Lycostomus rubrocinctus* Fairm. from the same area.

The specimen of *Lyponia patruelis* Kleine deposited in Kleine's collection (type No. 618) is designated as paratype but Kleine did not designated holotype and this specimens is designated here as paralectotype. This specimen is conspecific with lectotype (deposited in NRMS).

**Distribution.** Widespread species occurring throughout southern China (Yunnan), northern Burma and northern Vietnam. No specimens were collected in northern Thailand or Laos. Probably more restricted to mountainous areas, in Yunnan collected also in elevation 3900 m a. s. l.

### *Lyponia (Ponyalis) himalejica* Bourgeois

Figs 42, 45, 48, 52 - 53, 81

*Lyponia himalejica* BOURGEOIS, 1885:79; Kleine, 1924: 172. **Lectotype**, ♂ (hereby designated): Darj. (MP).

*Lyponia waterhousei* GORHAM, 1890:543 - **syn.n.** (?). 1♂: "Indes" (MP - according the description male specimens from type series were deposited in the Calcutta Museum. One male specimen has been found in the Muséum National d'Histoire Naturelle, Paris. No specimen of original Gorham's collection should be deposited in this Museum and that is why I do not consider it to be part of type series regardless the same locality and very probably Gorham's hand written label).

*Lyponia ochraceicollis* PIC, 1923:9 - **syn.n.** **Lectotype**, ♂ (hereby designated): "Bor Son" (MP); 1♂, **paralectotype**, the same locality data (MP);

*Lyponia aurantiaca* PIC, 1927:5 - **syn.n.** **Holotype**, ♂: "Tonkin, Chapa, 25. iv. 1918, Jeanvoine" (MP).

*Lyponia robusticollis* PIC, 1939:165 - **syn.n.** **Holotype**, ♀: Nen Muh" (hand-written, difficult to read), (MP).

**Additional material examined.** 1♂, Siam, 21. iii. 1958 (LMB) 1♂, Thailand, Doi Suthep, 11. v. 1981 (KM); 1♀, Thailand, Doi, 18. iv. 1985 (KM), 2♀, Thailand, Chiang Mai, Suthep, v. 1991, P. Pacholátko lgt. (LMB); 1♂ and 1♀, ditto, 20.4.1993 (LMB); 1♀, Thailand, Soppong - Pai, 1800 m, 1. - 8. v. 1993, P. Pacholátko and L. Dembický lgt. (LMB); 2♀, Yunnan, Gaoligong mts., 1500 - 2500 m, 17. - 24. v. 1995 (LMB); 1♂, Burma, Ruby Mts., Doherty (ZIW). 1♂, Thailand, Chiang Mai, Doi Suthep to Doi Pui, 19. - 23. iv. 1991, J. Horák lgt. (LMB); 1♀, Vietnam, Chapa, 22. v. 1963, G. Kabakov lgt. (SK); 1♀, Burma, Ruby Mts., Doherty (ZIW); 1♀, Hte Birmanie, Etat de Momeit, 600 m, Doherty, 1890 (SK); 1♀, without locality data (SK).

**Diagnosis.** The pronotum and elytra of *L. himalejica* are wider than in *L. limbaticollis*. Discal patch of pronotum is usually missing, when present, then of very limited extent, never adjacent to basal margin of pronotum and always gradually becoming lighter at margins.

**Description.** (Holotype of *L. himalejica* Bourg.): Body robust, flattened, black, whole elytra and wide margins of pronotum red. Head small, antennal tubercles well marked,

separated by deep groove, behind tubercles shallow transversal depression. Antennae reaching three fifths of length of elytra, with lamellae, basal segment with flattened upper surface (Fig. 48), lamellae slender, lamella of segment 6 shorter than the same of segment 7. Maxillary palpi slender, apical segment triangular.

Pronotum broad, wider than long, lateral margins convex, whole surface covered with dense brown pubescence, surface of middle patch shining, lighter margins with inconspicuous rough structure. Scutellum parallel-sided, flat, deeply emarginate (emargination reach about half of width of scutellum at apex). Elytra slightly widened backwards, flat, broad, all primary costae but costa 4 apparently different from secondary ones only at very base, costa 4 well marked in whole basal half of elytra. Transversal costae regular, dense, cells transverse.

Measurements: Length 10.9 - 15.0 mm, width at humeri 3.25 - 4.35 mm, pronotum L/W: 1.80 - 2.54 / 2.47 - 3.26 mm.

Variability: *Lyponia himalejica* Bourg. shows a considerable variability in two aspects: pronotum can be concolorous orange red to bright red or a median infusate area can occur. Rarely nearly 50 per cent of a surface of the disc can be dark brown to black as observed in holotype of *L. himalejica* Bourg. A border between red and dark areas is never sharp. A high degree of variability has also been found in the shape of male antenna. Both basal segments and lamellae can be very broad (type of *L. robusticollis* Pic) to very slender (type of *L. himalejica* Bourg.). Various intermediate stages have been found in different populations and no abrupt change in the variability spectrum can be proved. Because also all trials to process measured data statistically had failed I propose to consider all species described by Gorham and Pic to be synonyms of *L. himalejica* Bourgeois.

**Distribution.** *L. himalejica* Bourg. is a very widespread species known from Darjeeling (type locality), Burma, Northern Thailand, Laos and Northern Vietnam.

### The *tryznai* group

**Remarks.** *L. tryznai* sp.n. is a very isolated species showing a primitive structure of antennae and phallus. The coloration of pronotum unites it with the *alternata* group. Because of lack of other uniting characters this species is treated separately as an independent species group.

### *Lyponia (Ponyalis) tryznai* sp.n.

Figs 39, 76

**Holotype.** ♂: China, Sichuan, Dayi Dafeishui Forest, cca 110 km W of Chengdu, 22. vi. 1993 (LMB).

**Etymology.** A patronym in honour of Mr. M. Trýzna, Ústí n. L., Czech Republic.

**Diagnosis.** *L. tryznai* sp.n. is very well characterised by the shape of male genitalia (Fig. 76), the structure of elytral costae and the coloration of the pronotum.

**Description.** Body medium-sized, slightly widened backwards, black, only elytra brownish red. Head small, shining, covered with brown pubescence, eyes small, hemispherically prominent, antennal tubercles smaller, deep depression behind them present, antennae with lamellae, slightly reaching over middle of elytra, from segment 5 lamellate, segment 3 nearly parallel (Fig. 39). Pronotum flat, shining, widest at base,

covered with sparse pubescence, with shallow depressions at margins, scutellum apparently emarginate at apex. Elytra with well marked primary costae, only. Male genitalia with characteristic apex (Fig. 76)

Measurements: Length 9.6 mm, width at humeri 2.37 mm, pronotum L/W: 1.41 / 1.76 mm.

**Distribution.** Known only from the type locality in central Sichuan.

### The *alternata* group

**Apomorphies.** Black colour of pronotum.

**Remarks.** *L. nigrohumeralis* Pic. shows more primitive shape of antennal segment 1 (absence of flattened area), not equalized primary and secondary elytral costae and specific apex of phallus which does not possess sharp lateral thorns. This species is united with the *alternata* group only on the basis of the common coloration of the pronotum and general appearance. The other species form a group of very closely relative species showing strict vicariance throughout the whole area of occurrence and they are more closely related each other than to *L. nigrohumeralis* Pic. Their relationship is based on shape of elytra, male genitalia and antennae. The series of species was described by Nakane and according to the material at my disposal the given characters are good for separating of these species. It is interesting that much lower variability has been found in this group than in the very relative group of *L. himalejica* Bourg.

### *Lyponia (Ponyalis) alternata* Pic

Figs 41, 78

*Lyponia alternata* Pic, 1927:5. **Holotype**, ♂: "Tonkin, Than Maui, 31. iii. 1918, Jeanvoine" (MP).

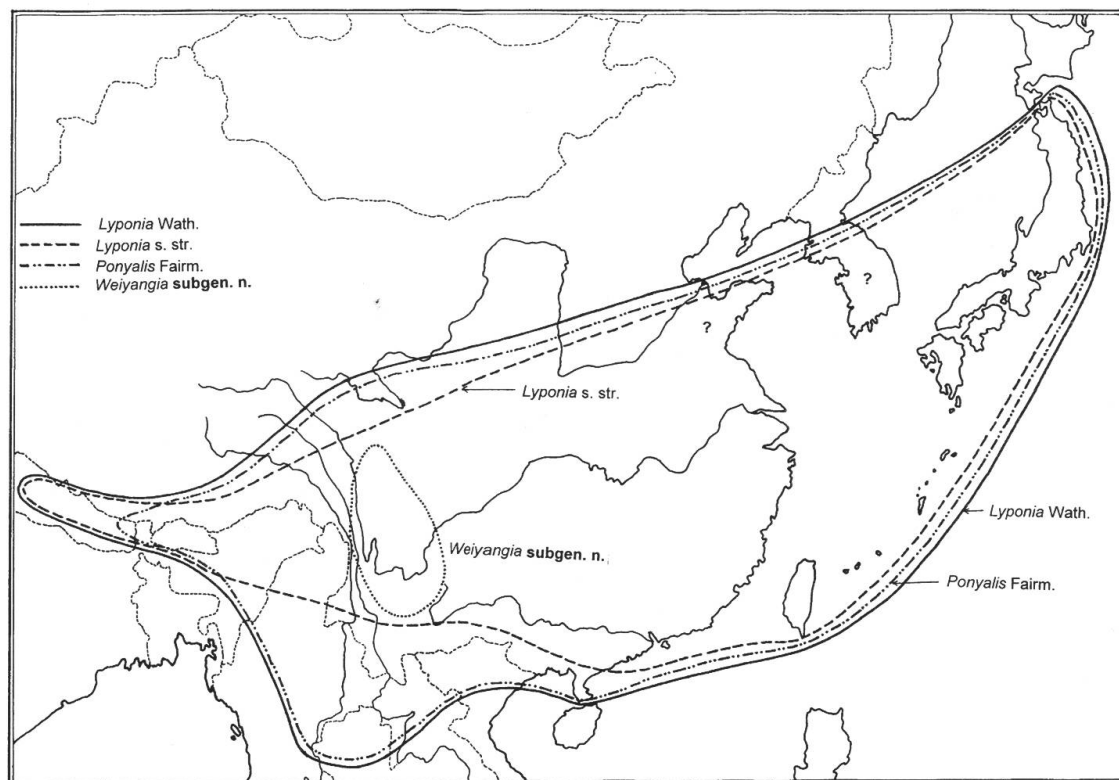
**Additional material examined.** 2♂, 2♀, N Vietnam, Tam Dao, 20. - 23. ii. 1962, Kabakov lgt. (SK, LMB).

**Diagnosis.** The more robust male antennae separate this species from very close *L. gestroi* Pic. The slightly distinguished primary and secondary costae are another separating character.

**Description.** Body robust, black, only elytra cinnabar red. Head small, with apparent tubercles and transversal depression. Antennae reaching at three fifth of length of elytra, segment 1 with flattened upper surface, segments 3 and 4 broad, without lamellae (Fig. 41), segments 5 to 10 with lamellae, lamellae comparatively broad and short (compare with *L. gestroi*). Pronotum flat, shining, covered with short, dense brownish pubescence, slightly punctured at lateral margins. Scutellum with very weak emargination at apex. Primary and secondary costae apparently different only at base, at apex only costa 2 and 4 stouter. Male genitalia stout, with thorns at apex (Fig. 78).

Measurements: Length 11.0 - 13.0 mm, width at humeri 3.12 - 4.10 mm, pronotum L/W: 1.70 - 2.26 / 1.99 - 3.00 mm.

**Distribution.** Known from northern Vietnam only.



Map 1: The distribution of the genus *Lyponia* Wat. and subgenera *Weiyangia* subg.n., *Lyponia* s.str. and *Ponyalis* Fairm.

### *Lyponia (Ponyalis) gestroi* Pic

Figs 40, 75

*Ponyalis gestroi* PIC, 1912: 2; KLEINE, 1927: 98.,

*Lyponia gestroi* (PIC, 1912): NAKANE, 1973: 9 - 14; BOČÁK & BOČÁKOVÁ: 1987: 281.

*Lyponia formosana* KLEINE, 1924: 174; KLEINE, 1926: 98.

**Additional material examined.** 2♂, Taiwan, Kosempo, Sauter S. V., 27. iii. - 3. iv. 1908 (LMB); 1♂, Taiwan, Hoozan, iii. 1910, H. Sauter S. G. (LMB); 1♀, Taiwan, Alishan, 2400 m, J. and S. Klapperich leg. (LMB); 1♂, Ivimote Isl., Loo Choo (East Coast of Formosa), Shirahama, 29. iii. 1965, leg. H. Yokoyama (LMB)

**Diagnosis.** *L. gestroi* is very close to *L. alternata* Fairm. and *L. oshimana* Nak. from which it differs in shape and the length of lamellae of antennae. The origin of these species due to vicariance events is very probable.

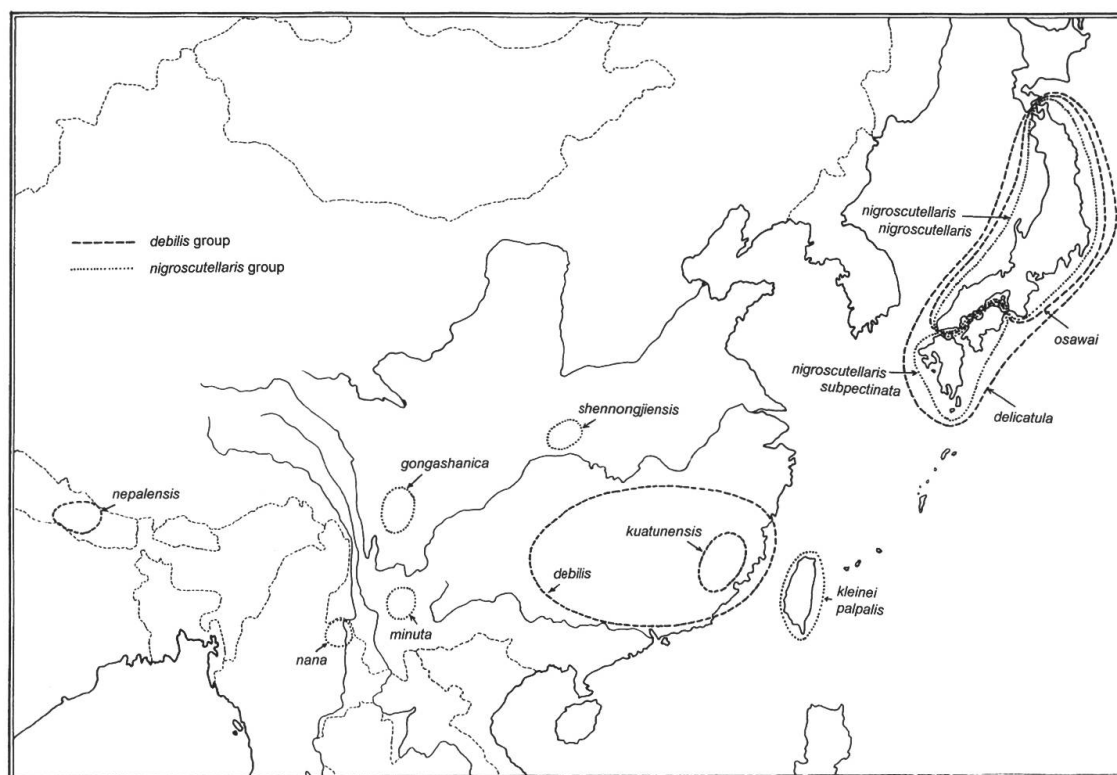
**Description.** Body robust, black to dark brown, only elytra red. Head small, with apparent tubercles and transversal depression. Antennae reaching to three fifths of length of elytra, segment 1 with flattened upper surface, segments 3 a 4 broad, without lamellae (Fig. 40), segments 5 to 10 with lamellae, lamellae comparatively slender and long (compare with *L. alternata*). Pronotum flat, shining, covered with short, dense brownish pubescence, slightly punctured at lateral margins. Scutellum with very weak emargination at apex. Primary and secondary costae slightly different only at very base, at apical half no difference observable. Apex of male genitalia only lightly projected (Fig. 75)

Measurements: Length 11.2 - 13.8 mm, width at humeri 3.14 - 3.96 mm, pronotum L/W: 1.78 - 2.26 / 2.14 - 2.71 mm.



**Remarks.** The colour of the elytra of Taiwanese specimens differs slightly from that of specimens from the Asian continent. They are a bit more orange. The body of the part of the Taiwanese Lycidae, supposed to be of Oriental origin, is clear orange and the tendency of Lycidae to form Muellerian mimicry complexes is generally known. Specimen of *Lyponia gestroi* from Loo Choo is of the same colour as the species from the genus *Lyponia* from the continent.

**Distribution:** Known from Taiwan and adjacent islands only.



Map 2: The distribution of the representatives of the subgenus *Lyponia* s.str.

### *Lyponia (Ponyalis) oshimana* Nakane

Figs 44, 80

*Lyponia oshimana* Nakane, 1961: 14

**Material examined.** 1♂, Amami Oshima, Hatsuno, 2. iv. 1964, coll. J. Nagao (NHMB - Frey coll.); 1♀, ditto, 18. iii. 1964, leg. S. Fukuda (NHMB - Frey coll.) - identified by T. Nakane.

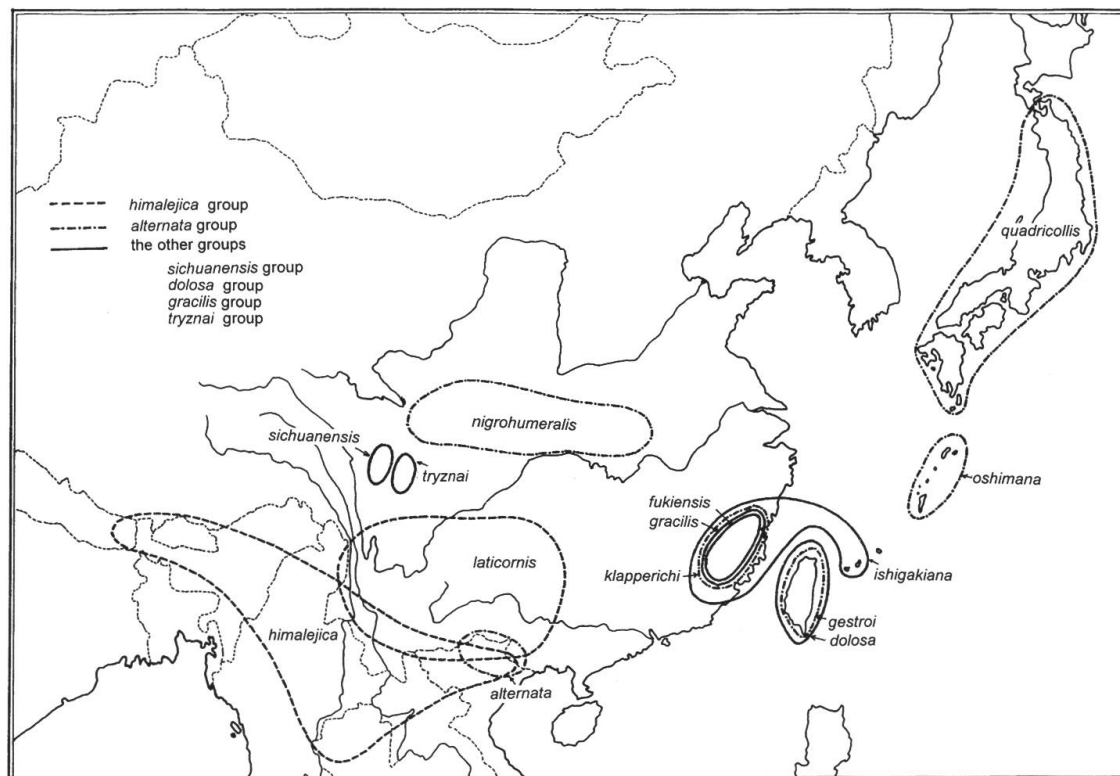
**Diagnosis.** *L. oshimana* Nak. is characteristic in the shape of male antennae and equalised primary and secondary costae of elytra.

**Description.** Body robust, black to dark brown, only elytra brownish red. Head small, with apparent antennal tubercles and transversal depression behind them. Antennae reaching to three fifths of length of elytra, segment 1 with flattened upper surface, segments 3 and 4 broad, without lamellae (Fig. 44), segments 5 to 10 with lamellae, lamellae shorter and slender. Pronotum flat, shining, covered with short, dense brownish pubescence, slightly punctured at lateral margins. Scutellum with weak emargination at apex. Primary and secondary costae slightly different only at very base of elytra. Male

genitalia with thorns at apex, apical part apparently projected (Fig. 80).

Measurements: Length 11.5 - 12.0 mm, width at humeri 3.36 - 3.48 mm, pronotum L/W: 1.87 - 2.16 / 2.21 - 2.52 mm.

**Distribution.** Endemic to the Amami Oshima Islands.



Map 3: The distribution of the representatives of the subgenus *Ponyalis* Fairm.

### *Lyponia (Ponyalis) quadricollis* (Kiesenwetter)

Figs 46, 91, 92

*Celetes quadricollis* KIESENWETTER, 1874: 252.

*Lyponia quadricollis*: GORHAM, 1883: 404; KLEINE, 1924: 171.

*Eros militans* KIESENWETTER, 1874: 253.

**Additional material examined.** Japan: Kumanotaira near Kuruizawa, 8. v. 1910, Edme Gallois 2♂, 1♀; Shimauchi, Matsumoto City, Nagano pref., 3. vi. 1984, T. Hattori lgt., 1♂; Mt. Takao, near Hachioji, 23. iv. 1910, Edme Gallois, 4♂, 1♀; Nikkawa Rindo, Yamanashi Pref., 30. v. 1982, K. Akiyama lgt., 2♂; (LMB).

**Diagnosis.** The shape of male antenna and at least partly distinguished primary and secondary elytral costae separate *L. quadricollis* (Kiesw.) from the other members of this species group, except *L. klapperichi* sp.n. which is distinguishable only by the shape of male genitalia.

**Description.** Body medium sized, black to dark brown, only elytra brownish red. Head small, antennal tubercles and transversal depression present, antennae reach to three fifths of length of elytra, with lamellae, segment 1 with flat upper surface, segment 3 triangular without lamella (Fig. 46), lamellae of segments 6 to 10 long and approximately as long as wide, slightly constricted in basal half, basal part of lateral margin sometimes lighter, shining, covered with brownish pubescence. Scutellum

slightly emarginate at apex, elytra nearly parallel-sided, primary costae slightly stouter in whole length. Male genitalia with thorns at apex, apex projected forwards (Figs 91, 92).

Measurements: Length 8.2 - 10.8 mm, width at humeri 2.52 - 3.26 mm, pronotum L/W: 1.47 - 1.1.84 / 2.08 - 2.31 mm.

**Distribution.** Widely distributed in Japan (except Hokkaido).

***Lyponia klapperichi* sp.n.**

Figs 1 - 20, 77

**Holotype**, ♂: China, Kuantun (Fukien), 4. v. 1946 (NHMB); **Paratypes**: the same locality data, 6. iii. - 26. v. 1946 and 6. iv. - 25. v. 1938, 47♂, 75♀ (NHMB, MAKB, SK, LMB).

**Etymology.** A patronym in honour of Mr. J. Klapperich from Bonn.

**Diagnosis.** This species bears very close affinity to *Lyponia quadricollis* Kiesw. from which it differs in the shape of male genitalia (Fig. 77).

**Description.** Body medium sized, black to dark brown, only elytra brownish red. Head small, antennal tubercles and transversal depression present, antennae reach to three fifths of length of elytra, with lamellae, segment 1 with flat upper surface, segment 3 triangular without lamella, lamellae of segments 6 to 10 long and approximately as long as wide, slightly constricted in basal half, basal part of lateral margin sometimes lighter, shining, covered with brownish pubescence. Scutellum slightly emarginate at apex, elytra nearly parallel-sided, primary costae slightly stouter in whole length. Male genitalia with thorns at apex, apex widened, frontal margin nearly straight (Fig. 77).

Measurements: Length 9.9 - 11.4 mm, width at humeri 2.64 - 3.36 mm, pronotum L/W: 1.49 - 1.87 / 2.11 - 2.35 mm.

**Distribution.** *L. klapperichi* sp.n. has been collected in southern China only. No data are known from central China.

***Lyponia (Ponyalis) nigrohumeralis* Pic**

Figs 43, 79

*Lyponia nigrohumeralis* Pic, 1938: 220. **Holotype**, ♂: "Kansou" (MP).

**Additional material examined.** 1♂, China, Shaanxi prov., Hua Shan Peak env., 100 km E of Xi'an, 17. - 22. vi. 1991 (LMB); 3♂, China, Sichuan, Abazhou, Nanping, Jiuzhaigou, 2000 m, 8. - 13. vi. 1990 (LMB); China, Sichuan, Nanping, 1500m, 14. vi. 1990 (LMB); 1♀, 1♂, China, Sichuan, Dayi Dafeishui Forest, cca 110 km W of Chengdu, 22. vi. 1993 (LMB); 2♂, China, S Shanxi, Quiling mts., S slope, Xunyangba, 1400 - 2000 m, 5. - 9. vi. 1995 (LMB), 1♀, China, Hubei, Shennongjia Nat. Res., E slope of Dashennongjia, 2000 m, 12. - 15. vi. 1997, Bolm lgt. (LMB).

**Diagnosis.** *L. nigrohumeralis* Pic is the only species within the genus *Lyponia* with darkened part of elytra. In rare cases, when elytra are nearly unicolorous the shape of male genitalia enables sure identification.

**Description.** Body robust, black, only part of elytra red. Humeral part of elytra black. In extremely high extent whole margin of elytra including sutural one, whole humerus and humeral quarter of primary costae black, at least only very small area of elytra adjacent to scutellum darkened. Head small, antennal tubercles well developed, shallow transversal depression behind them present, antennae reaching over middle of elytra, with lamellae, segment 1 without flattening of upper surface, segment 3 slightly widened at apex (Fig. 43), lamellae of segments 5 to 10 long, slender. Pronotum approximately

as long as wide, surface shining, covered with dense short pubescence, rough structure at margins less conspicuous. Scutellum apparently emarginate at apex. Elytra nearly parallel sided, primary costae differ from secondary ones in whole length. Male genitalia slender, thorns at apex present, apex projected forwards (Fig. 79).

Measurements: Length 11.0 - 13.1 mm, width at humeri 2.95 - 3.55 mm, pronotum L/W: 1.66 - 1.78 / 2.21 - 2.38 mm.

**Distribution.** Widely distributed throughout central China (Sichuan, Shaanxi, Hubei). It has not been found in extensive material from northern Yunnan.

### **Species inquirenda**

Type specimens of following species have not been found in the studied material or in the collections and according to very poor descriptions of Maurice Pic even a subgeneric classification is not possible.

#### ***Lyponia guerrii* PIC, 1939: 165**

Pic's description gives following information: "Body quite robust, upper side with grey pubescence, brownish rufescent, elytra and pronotum frontally and laterally testaceous, antennae broad, apical segments partially dentate, pronotum transverse, apparently narrower than elytra, elytra subparallel, apex narrowed, primary costae differ from secondary ones, elytral cell transverse. Length 12 mm, China, Yunnan. Differs from *L. debilis* Wat. in lighter coloration and different structure of elytra."

PIC (1939) did not give any indication about the sex of described specimen. According to the shape of antennae he had probably a female at his disposal. The only known Yunnanese species with described colour pattern is *L. pertica* sp.n. which is smaller, has very slender antennae in both sexes, is slender and does not have transverse elytral cells. *Lyponia laticornis* Fairm. could be identical with *L. guerrii* according to given description.

#### ***Lyponia robusta* PIC, 1922: 13**

Following description was given by PIC (1922): "Elongate, parallel, black, elytra and lateral margins of pronotum reddish, antennae strong. Length 13 mm. Very near to *L. debilis* Wat. but darker and elytra shorter."

This description gives no useful information and without the type no classification is possible.

#### ***Lyponia diversicornis* PIC, 1926: 70.**

A translation of Pic's description: "Elongate, robust, elytra and margins of thorax red, antennae compressed, from segment 5 with long lamellae, thorax transverse, with longitudinal groove in middle, margins approximately straight, frontal margin slightly convex, elytra a bit broader than thorax, primary and secondary costae of same strength. Length 12 mm. China, Yunnan (coll. Pic). Near to *L. waterhousei* from which it differs in characters stated above."

The structure of elytral cells and coloration of thorax shows relationship of this

species with the *himalejica* group. Nothing more can be said without study of holotype.

A species excluded from the genus *Ponyalis* Fairm.

### ***Macrolycus praedicabilis* (Kleine)**

*Ponyalis praedicabilis* KLEINE, 1939: 17. **Lectotype**, ♂ (hereby designated): N. E. Burma, Kambaiti, 7 000 ft., 25. - 22. 4. 1934, R. Malaise (NRMS). **Paralectotype**, ♀, ditto, 3. - 2. 5. 1934 (NRMS).

*Macrolycus bowringi* Wat.: KASANTSEV, 1993: 50

**Remarks.** *P. praedicabilis* Kln. was synonymized with *M. bowringi* Wat. by KASANTSEV (1993) without study of primary types of both species. The lectotype of *P. praedicabilis* Kln. is hereby designated.

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### **References**

- BOCÁK, L. and M. BOCÁKOVÁ (1987): A review of *Lycidae* (Coleoptera) from Taiwan, with description of a new species. *Acta Entomol. Bohemoslov.* 84: 273 - 286.
- BOCÁK, L. and M. BOCÁKOVÁ (1990): Revision of the supergeneric classification of the family *Lycidae* (Coleoptera). *Polskie Pism. Entomol.* 59: 623 - 676.
- BOURGEOIS, J. (1885): *Diagnoses de Lycides nouveaux ou peu connus. 5e partie.* *Ann. Soc. ent. Fr.* (6) 5: 71 - 84.
- BRUNDIN, L. Z. (1981): *Croizat's Panbiogeography versus Phylogenetic Biogeography*. In: *Vicariance Biogeography*. Newton G. and D. E. Rosen (eds). Columbia University Press. New York.
- FAIRMAIRE, L. (1889): *Coléoptères de l'intérieur de la Chine. 5e partie.* *Ann. Soc. ent. Fr.* (6) 9:36 - 37.
- FAIRMAIRE, L. (1899): *Descriptions de Coléoptères nouveaux recueillis en Chine par M de Latouche.* *Ann. Soc. Ent. Fr.* 68: 616- 642.
- FARRIS, J. S. (1988): *Hennig86 Reference. Version 1.5 manual.*
- GORHAM, H. S. (1883): *Revision of the genera and species of Malacoderm Coleoptera of the Japanese Fauna.* *Trans. Ent. Soc. Lond.* 1883: 393 - 411.
- GORHAM, H. S. (1890): *Notes on the species of the families Lycidae and Lampyridae, contained in the Imperial Museum of Calcutta, with descriptions of new species, and a list of the species at present described from India.* *Trans. Ent. Soc. Lond.* 1890: 543.
- KASANTSEV, S., 1993: *Lycides nouveaux ou peu connus de l'Indochine (Coleoptera).* *Bull. Mus. natl. Hist. nat. Paris*, 4e sér. 15: 49 - 68.
- KIESENWETTER, H. v. (1874): *Die Malacodermen Japans nach dem Ergebnisse der Samlungen des Herrn G. Lewis während der Jahre 1869 - 1871.* *Berl. Ent. Zeitschr.* 18: 241 - 288.
- KLEINE, R. (1924): *Die Gattung Lyponia Waterhouse.* *Ent. Bl.* 20 (3): 170 - 175.
- KLEINE, R. (1926): *Die Lyciden Formosas.* *Stett. Ent. Zeit.* 87: 97 - 109
- KLEINE, R. (1939): *Entomological results from the Swedish expedition 1934 to Burma and British India. Coleoptera: Brenthidae und Lycidae, gesammelt von Herrn René Malaise.* *Arkiv Zool.* 31A (12): 17 - 18.
- LIPSCOMB, D. (1994): *Cladistic Analysis Using Hennig86.* George Washington University.
- NAKANE, T. (1961): *The Lycid-beetles from the Loochoo Islands, with descriptions of a few new forms (Coleoptera).* *Ent. Rev. Japan* 13 (1): 11 - 15.
- NAKANE, T. (1967): *Descriptions of three new species of Lycid-beetles from Formosa, with notes on some others (Insecta, Coleoptera).* *Bull. Nat. Sci. Mus. Tokyo* 10 (3): 286.
- NAKANE, T. (1969): *Fauna Japonica. Lycidae (Insecta: Coleoptera).* Academic Press of Japan. 224 pp.
- NAKANE, T. (1971): *Formosan Lycidae in the Collection of the California Academy of Sciences (Insecta, Coleoptera).* *Bull. Nat. Sci. Mus. Tokyo* 14 (2): 140.
- NAKANE, T. (1973): *Notes on the Types of Formosan Lycidae described by Maurice Pic in the Collection of the Muséum National d'Histoire Naturelle, Paris (Insecta: Coleoptera).* *Bull. Nat. Sci. Mus. Tokyo* 16 (1): 9 - 14.
- NAKANE, T. (1983): *Coleoptera of Nepal collected by the members of the Hokkaido University Scientific expedition to Nepal Himalaya: Lycidae.* *Rep. Fac. Sci., Kagoshima Univ. (Earth Sci. & Biol.)* 16: 115 - 123.

- OHBAYASHI, K. (1956): *New Lycidae from Japan (Coleoptera)*. Akitu, Kyoto 5 (3): 59.
- PIC, M. (1912): *Notes sur certains genres litigieux ou peu connus*. Mélanges exot-ent. 3: 1-3.
- PIC, M. (1922): *Contribution a l'étude des Lycides*. Echange No. 407: 13 hors texte.
- PIC, M. (1923): *Etudes des Malacodermes de l'Indochine recueillis par M. R. Vitalis de Salvaza*. Faune Indochine Franc. 1: 9.
- PIC, M. (1926): *Sur le genre Lyponia Wat. (Col. Lycidae)*. Bull. mens. Soc. Linn. Lyon 5: 70.
- PIC, M. (1927): *Coléoptères de Indochine*. Mélanges exot-ent. 49: 1 - 36.
- PIC, M. (1937): *Coléoptères nouveaux de Chine*. Not. Ent. Chin. Mus. Heude 4 (7): 16.
- PIC, M. (1938): *Nouveaux Coléoptères du Siam*. Bull. Soc. Zool. Fr. 1938: 352 - 356.
- PIC, M. (1939): *Malacodermes exotiques*. Echange No.475: 165.
- WATERHOUSE, C. O. (1878): *On the different form occurring in the coleopterous family Lycidae, with descriptions of new genera and species*. Trans. Ent. Soc. Lond. 1878: 95 - 118.
- WATERHOUSE, C. O. (1879): *Illustrations of the typical specimens of Coleoptera in the collection of the British Museum. Part I - Lycidae*. London. 93 pp.

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