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Contribution to the knowledge of Chinese Phasmatodea II: Review of the Dataminae Rehn & Rehn, 1939 (Phasmatodea: Heteropterygidae) of China, with descriptions of one new genus and four new species

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Abstract

This paper deals with four genera and eight species of the subfamily Dataminae Rehn & Rehn, 1939 from China. One new genus and four new species, *Hainanphasma cristata* Ho gen. nov. spec. nov., *H. diaoluoshanensis* Ho spec. nov., *Pylaemenes pui* Ho spec. nov. and *Pylaemenes shirakii* Ho & Brock spec. nov., are described and illustrated. A new combination is proposed: *Planispectrum hainanensis* (Chen & He, 2008) comb. nov. is transferred from *Pylaemenes* Stål, 1875 and its male and egg are described for the first time. The occurrence of *Orestes mouhotii* (Bates, 1865) in China is re-confirmed assessed by an adult specimen collected from Yunnan Province. *Pylaemenes guangxiensis* (Bi & Li, 1994) is reported for the first time from Vietnam outside the range of China. Keys to the genera and species of the Chinese Dataminae are given.

Key words: Dataminae, *Hainanphasma*, *Orestes*, *Planispectrum*, *Pylaemenes*, new genus, new species, new combination, China

Introduction

The Dataminae Rehn & Rehn, 1939 consists of seven genera with 32 species, mainly distributed over the Oriental region (Zompro 2004; Otte & Brock 2005; Brock 2013). *Dares* Stål, 1875, *Epidares* Redtenbacher, 1906, *Spinodares* Bragg, 1998 and *Woodlarkia* Günther, 1932 are not recorded in China and only two genera, *Planispectrum* Rehn & Rehn, 1939 [= *Platymorpha* Redtenbacher, 1906; = *Platyphasma* Uvarov, 1940] and *Pylaemenes* Stål, 1875 [= *Datames* Stål, 1875], have been recorded (Hennemann *et al.* 2008; Chen & He 2008). *Orestes mouhotii* (Bates, 1865) was considered to be misidentified in China (Hennemann *et al.* 2008: 43). By the examination of an adult specimen collected from Yunnan Province, *O. mouhotii* is proved to be found in China. Furthermore, recent collecting trips in various localities in China and examination of collections in SEM, SNU, and SYSBM uncovered one new genus and four new species, *Hainanphasma cristata* gen. nov. spec. nov., *H. diaoluoshanensis* spec. nov., *Pylaemenes pui* spec. nov. and *P. shirakii* spec. nov. A new combination: *Planispectrum hainanensis* (Chen & He, 2008) comb. nov. is proposed. It is here transferred from *Pylaemenes*. After these additions and new combination, eight species in four genera are currently attributed to the Dataminae of China.

Material and methods

This study is based on types and other material examined in the collections mentioned below and, relevant phasmid literature. The sequence of genera and species is in alphabetical order. Morphological terms follow Bragg (1997, 2001) and Zompro (2004). Ootaxonomic descriptions refers to Clark (1976a, 1976b, 1979, 1988, 1998), Clark-Sellick (1997) and Zompro (2004). Measurements are given in millimeters (mm.) for all the taxa. The newly

described taxa are deposited in HKES, KFBG, SEM, SNU, SYSBM and GH. The abbreviations used for collections are as follows:

BFU	Beijing Forestry University, Beijing, China.
CAU	China Agricultural University, Beijing, China.
HBU	College of Life Science and Museum, Hebei University, Baoding, Hebei, China.
HKES	Hong Kong Entomological Society, Hong Kong.
HKU	The University of Hong Kong, Hong Kong.
IZCAS	Institute of Zoology, Chinese Academy of Sciences, Beijing, China.
KFBG	Kadoorie Farm and Botanic Garden, Hong Kong.
MHNG	Muséum d'Histoire Naturelle, Geneva, Switzerland.
SEM	Shanghai Entomological Museum, Chinese Academy of Sciences, Shanghai, China.
SNU	Shanghai Normal University, Shanghai, China.
SYSBM	Museum of Biology, Sun Yat-Sen University, Guangzhou, Guangdong, China.
TLEF	Tai Lung Experimental Farm, Agriculture, Fisheries and Conservation Department, Authority of Hong Kong Special Administrative Region, Hong Kong.
UMO	Hope Entomological Collections, University Museum, Oxford, United Kingdom.
GH	Private collection of George Ho Wai-Chun, Hong Kong.

For the distribution of each species in the checklist, the Chinese provinces, administrative region and Taiwan have been abbreviated as follows:

FJ: Fujian.
GD: Guangdong.
GX: Guangxi.
HK: Hong Kong.
HN: Hainan.
JX: Jiangxi.
TW: Taiwan.
YN: Yunnan.

The names of plant species mentioned in this study are given according to “Check List of Hong Kong Plants 2012” compiled by Hong Kong Herbarium (AFCD 2012).

Systematics

Family Heteropterygidae Kirby, 1896: 472

Subfamily Dataminae Rehn & Rehn, 1939: 405

Type-genus. *Datames* Stål, 1875: 51 [= *Pylaemenes* Stål, 1875: 51], priority used based on Rehn & Rehn, 1939.

Key to the genera of Chinese Dataminae Rehn & Rehn:

1. Whole body dorso-ventrally flattened; antennae slightly longer than profemora, never surpassing apices of protibiae *Planispectrum* Rehn & Rehn, 1939
- Whole body cylindrical; antennae distinctly longer than profemora, surpassing apices of protibiae 2.
2. Body robust and thick-built, thorax not parallel-sided and mesonotum distinctly carinate medially in female; mesonotum with spines in male *Pylaemenes* Stål, 1875
- Body slender and elongate, thorax parallel-sided and mesonotum with indistinct median carina in female; mesonotum unarmed in male 3.
3. Occiput elevated with a high crest and postero-dorsal carina of meso- and metafemora with three distinct fin-like lamellae in

female; fourth and fifth abdominal terga with distinct hump medio-posteriorly and postero-dorsal carina of meso- and metafemora with three large fin-like lamellae in male *Hainanphasma* Ho gen. nov.
 - Occiput lacking high crest and postero-dorsal carina of mesofemora and metafemora with indistinct lamellae in female; fourth and fifth abdominal terga lacking hump and postero-dorsal carina of meso- and metafemora with one to two small teeth in male *Orestes* Redtenbacher, 1906

Genus *Hainanphasma* Ho gen. nov.

(Figs. 1–18)

Type-species. *Hainanphasma cristata* Ho spec. nov., by present designation.

Diagnosis. Closely related to *Orestes* Redtenbacher, 1906, *Hainanphasma* Ho gen. nov. is distinguished by slenderer and thinner antennae in both sexes. The female is characterized by posteriorly projecting and punctulate occipital crest. The male is characterized by strongly elevated occipital crest, distinctive hump on fourth and fifth abdominal terga and postero-dorsal carina of meso- and metafemora with three distinct fin-like lamellae. Also closely related to *Pylaemenes* Stål, 1875, *Hainanphasma* Ho gen. nov. is distinguished by slenderer and thinner antennae in both sexes. The female differs by faint median carina and parallel-sided thorax. The male differs by indistinct median carina and unarmed thorax. Egg structure of this new genus (Figs. 17–18) is distinctive and unique from all other genera in the subfamily.

Description. Medium-sized. Apterous. Body cylindrical, slender and granulose. Head oval-shaped. Occiput with a high crest and spine-like tubercles in both sexes. Eyes rounded. Antennae slender and thin, filiform, surpassing apices of protibiae. The first antennal segment triangular in cross section, with two or three distinct elevations (spine-like tubercles or lamella-like elevation) on outer edges. Thorax parallel-sided. Pronotum rectangular, longer than head. Mesonotum slender, not carinate medially, nearly parallel-sided in female, broadly emarginated medially in male. Metanotum longer than wide, about 3–3.5 x longer than median segment. Abdomen cylindrical. Ninth tergum with distinct crest-like structure. Cerci short and flattened. Profemora indistinctly curved basally. Antero-dorsal and postero-dorsal carinae of meso- and metafemora with fin-like lamellae.

Distribution. This new genus is endemic to Hainan and is widely distributed in most remaining primary forests areas.

Etymology. Combine with the words “Hainan” and ‘phasma’. The latter is a frequently used name in Phasmatodea meaning ghost.

Species included:

- | | |
|---|--------------|
| 1. <i>Hainanphasma cristata</i> Ho spec. nov. | [China (HN)] |
| 2. <i>Hainanphasma diaoluoshanensis</i> Ho spec. nov. | [China (HN)] |

Key to *Hainanphasma* Ho gen. nov.:

1. Outer edges of the first antennal segment with one tubercle latero-anteriorly, margin of the crest-like structure on ninth tergum with tubercles, posterior apex of the crest reaching or surpassing the posterior margin of the anal segment, meso- and metafemora with triangular armature *H. cristata* Ho spec. nov.
- Outer edges of the first antennal segment with two tubercles latero-anteriorly, margin of the crest-like structure on ninth tergum unarmed, posterior apex of the crest almost reaching posterior margin of the anal segment, meso- and metafemora with semi-circle armature *H. diaoluoshanensis* Ho spec. nov.

Hainanphasma cristata Ho spec. nov.

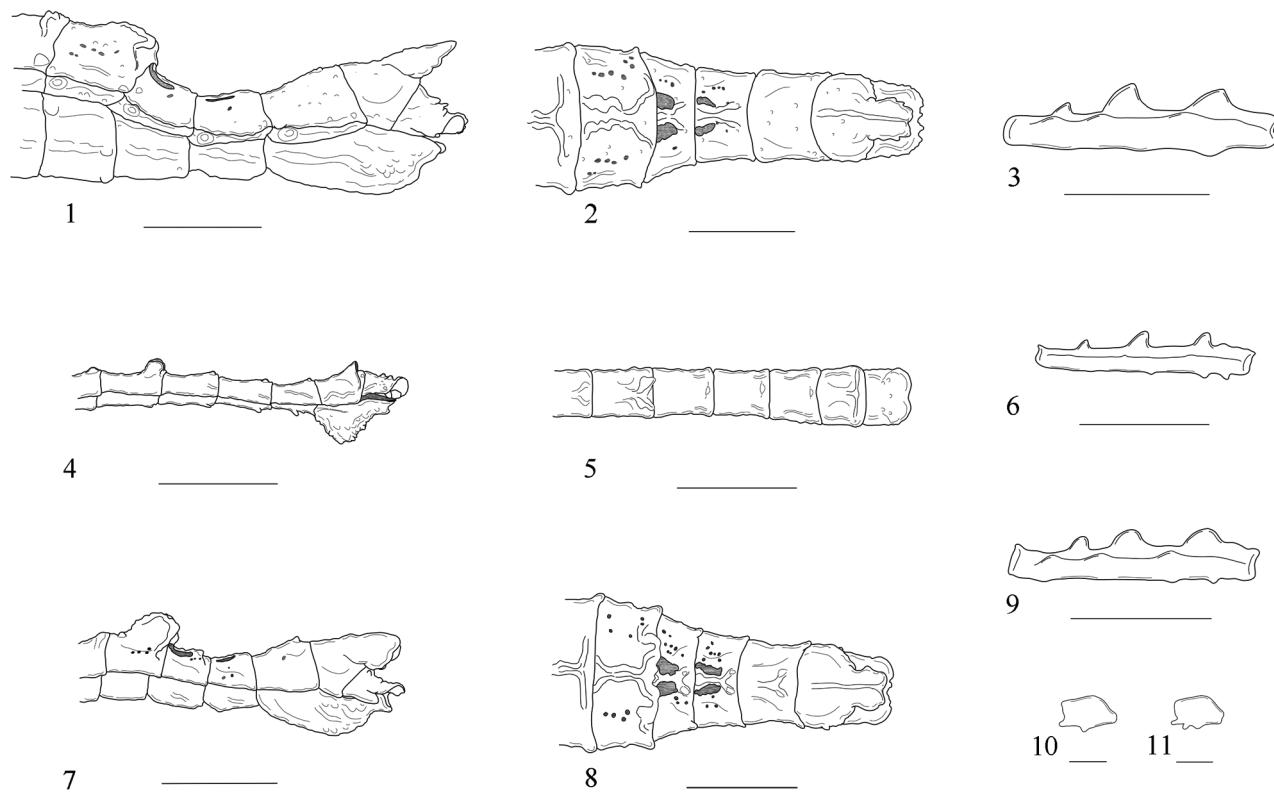
(Figs. 1–6, 10, 12–13, 15, 17–18)

Types. Holotype: ♀, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China, 15.IV.2011, George Ho Wai-Chun (SYSBM, ex coll. GH); Paratypes [11 males, 11 females, 15 eggs]: 1♀, 3♂♂, 5 eggs, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China, 15–16.IV.2011, George Ho Wai-

Chun (SYSBM, ex coll. GH & GH); ♀, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China, 7.VI.2008, George Ho Wai-Chun (GH); ♂♀, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China, 16.VII.2009, He Zhu-Qing (SNU); ♂, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China, 24.I.2010, George Ho Wai-Chun (GH); ♂, Yinggeling Nature Reserve, Baisha Country, Hainan Province, China, 27.IX.2010, George Ho Wai-Chun (GH); ♀, Wuzhishan National Nature Reserve, Wuzhishan Country, Hainan Province, China, 16–24.IV.2011, Hua Wen-Xuan (SEM); 2♂♂, 1♀, Yinggeling Nature Reserve, Baisha Country, Hainan Province, China, 20.VI.2011, George Ho Wai-Chun (KFBG & GH); 1♂, 3♀♀, 2 eggs, Huishan Nature Reserve, Qionghai Country, Hainan Province, China, 2.VII.2011, George Ho Wai-Chun (GH); 1♂, 1♀, 5 eggs, Shangxi Nature Reserve, Wanning Country, Hainan Province, China, 4.VII.2011, George Ho Wai-Chun (GH); 1♂, 2♀♀, 3 eggs, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China, 11–14.VII.2011, George Ho Wai-Chun (KFBG & GH).

Diagnosis. This new species is distinguished from *Hainanphasma diaoluoshanensis* Ho gen. nov. spec. nov. by its larger size, two elevations on outer edge of the first antennal segment, meso- and metafemora with triangular-shaped armature, and antero-dorsal and postero-dorsal carinae of metatibiae with two to three small fin-like lamellae.

Description. Female (Figs. 1–3, 10, 12, 15). Brown. Body cylindrical, granulated and with short ridges. More robust than male.



FIGURES 1–11. *Hainanphasma* Ho gen. nov. spp. **1.** *H. cristata* Ho spec. nov., HT female, apex of abdomen, lateral view [scale bar 5 mm]. **2.** *H. cristata* Ho spec. nov., HT female, apex of abdomen, dorsal view [scale bar 5 mm]. **3.** *H. cristata* Ho spec. nov., HT female, metafemur [scale bar 5 mm]. **4.** *H. cristata* Ho spec. nov., PT male, apex of abdomen, lateral view [scale bar 5 mm]. **5.** *H. cristata* Ho spec. nov., PT male, apex of abdomen, dorsal view [scale bar 5 mm]. **6.** *H. cristata* Ho spec. nov., PT male, metafemur (left) [scale bar 5 mm]. **7.** *H. diaoluoshanensis* Ho spec. nov., HT female, apex of abdomen, lateral view [scale bar 5 mm]. **8.** *H. diaoluoshanensis* Ho spec. nov., HT female, apex of abdomen, dorsal view [scale bar 5 mm]. **9.** *H. diaoluoshanensis* Ho spec. nov., HT female, metafemur (left) [scale bar 5 mm]. **10.** *H. cristata* Ho spec. nov., HT female, the first antenna (left), dorsal view [scale bar 1 mm]. **11.** *H. diaoluoshanensis* Ho spec. nov., HT female, the first antenna (left), dorsal view [scale bar 1 mm].



FIGURES 12–18. Habitus of *Hainanphasma* Ho gen. nov. spp. **12.** *H. cristata* Ho spec. nov., HT female, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China [scale bar 5 mm]. **13.** *H. cristata* Ho spec. nov., PT male, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China [scale bar 5 mm]. **14.** *H. diaoluoshanensis* Ho spec. nov., HT female, Diaoluoshan National Nature Reserve, Lingshui Country, Hainan Province, China [scale bar 5 mm]. **15.** *H. cristata* Ho spec. nov., HT female, head and thorax, dorsal view [scale bar 5 mm]. **16.** *H. diaoluoshanensis* Ho spec. nov., HT female, head and thorax, dorsal view [scale bar 5 mm]. **17.** *H. cristata* Ho spec. nov., egg capsule, dorsal view [scale bar 1 mm]. **18.** *H. cristata* Ho spec. nov., egg capsule, lateral view [scale bar 1 mm].

Head: Oval, but slightly rounded. Vertex with a pair of triangular tubercles placed behind the bases of antennae and following with a spine-like tubercle or a granule. Occiput with swollen high crest consisting of four carinae, surfaces slightly punctulate, with one to two spine-like tubercles on dorsal carinae, apex of the crest emarginate. Eyes dark brown, rounded. Genae with a short postocular carina behind the eyes. Antennae brown, darker in some segments, surpassing apices of forelegs, with 24–25 segments, second to fourteen segments with media furrow. The first segment very broad, triangular in cross section, with indistinct median carina, slightly shorter than the combined length of third and fourth segments; with two spine-like tubercles on outer edge, the anterior one placed near the apex, the posterior one placed at the middle. Second segment cylindrical, shorter than third segment.

Fifteen segment with a minute black spine on dorsal surface, apex toward anteriorly. Apical segment as long as third segment, very setose, apices rounded.

Thorax: Pronotum square, slightly longer than head, with an elevation surrounded by four short blunt spines before a transverse sulcus; with two short longitudinal carinae behind the transverse sulcus. Posterior margin with a pair of small granules placed at the end of the two longitudinal carinae and with another pair of small granules placed laterally of the median pair, both pairs of granules not present in some individuals. Mesonotum parallel-sided, median carina very weak, distinctly bifurcated at posterior end. Anterior margin carinate and broadly incurved, with four small granules. Lateral margins with a longitudinal carina and a row of small pits. Antero-lateral angles with a small granule. Mesopleura with three to four small granules. Metanotum longer than wide, about 3 x length of median segment, with granules and small pits. Mesosternum and metasternum with small granules.

Abdomen: Median segment with an x-shaped carina medially. Second to seventh terga with an x-shaped carina medially, weakly present in some individuals. Third to fourth terga with a short tubercle postero-laterally. Eighth tergum with a small elevation posteriorly. Ninth tergum with a crest-like structure medio-posteriorly, apically elongated posteriorly, usually surpassing the posterior margin of the anal segment, margin of the crest with one to three short tubercles, apex of the crest emarginate. Anal segment emarginated at posterior margin, postero-lateral angles elevated, lateral margins with one to two short spine-like tubercles. Subgenital plate boat-shaped, not projecting over the end of the anal segment, with distinct median carina and granules. Cerci flattened, hidden inside the anal segment, apices rounded.

Legs: Profemora nearly quadrate in cross section, curved basally, antero-dorsal and postero-dorsal carinae with two to three indistinct laminate elevations. Postero-dorsal carina of meso- and metafemora strongly waved with three fin-like lamellae, anterior one larger than the basal one. Antero-dorsal carina of meso- and metafemora with three to four small lamellae. Antero-ventral and postero-ventral carinae of meso- and metafemora with two spine-like tubercles or small lamellae subapically. Antero-dorsal and postero-dorsal carinae of all tibiae waved with two to three small fin-like lamellae. Medio-ventral carina of all femora and tibiae unarmed.

Male (Figs. 4–6, 13). Thinner and slenderer than female. Grayish brown to dark brown. Body rough, punctured and granulated.

Head: Sparsely covered with minute granules. Rounded, almost as long as wide. Vertex flat, with two pair of spine-like tubercles placed behind the bases of antennae, the anterior pair triangular-shaped, about 2–3 x length of the posterior pair. Occiput strongly protruding, with a high cone-like crest, V-shaped in dorsal view, surfaces punctulate, consisting of four carinae bearing spine-like tubercles. Eyes rounded, light brown. Antennae brown, some segments darker, with 20–25 segments, reaching apices of protarsi, with dense and minute brownish setae, very setose after fourteenth or fifteenth. The first segment broad, median carina indistinct, with two short tubercles on the outer edge, both tubercles placed before middle, the anterior one 1.5 x length of the posterior one. Second segment with a slight elevation on outer edge, shorter than third segment. Third segment shorter than the first segment, 1.5 x length of second segment. Apices of apical segment rounded. Fourteen segment or fifteen segment with a minute and black spine on dorsal surface, pointing anteriorly.

Thorax: Pronotum square, parallel-sided, with two rows of two small humps placed before a transverse sulcus. Anterior margin incurred, posterior margin truncate. Mesonotum parallel-sided, anterior margin carinate and elevated, median carina indistinct and with two flattened humps at the posterior margin. Lateral margins with a row of small pits. Mesopleura with two to three small granules along margins. Metanotum parallel-sided, 2 x longer than wide and 2 x the length of median segment, lateral margins with a row of small pits. Metapleura with small pits. Mesosternum and metasternum with a few granules.

Abdomen: Slender and cylindrical. Median segment fused with metanotum, broader than long, with x-shaped carina medially. Second to ninth terga with few pits along lateral margins and x-shaped carina medio-posteriorly. Ninth tergum with a small crest-like structure medio-posteriorly. Anal segment broadly emarginated posteriorly. Poculum with indistinct median carina, posterior margin broad, and near truncate or slightly notched. Cerci small and flattened, semicircular, apices rounded, reaching posterior margin of the anal segment.

Legs: Covered with minute brownish setae. Profemora slightly curved basally, antero-dorsal and postero-dorsal carinae with three to four indistinct elevations. Antero-dorsal carina of meso- and metafemora lacking elevations. Postero-dorsal carina of meso- and metafemora with three distinct fin-like lamellae, posterior one as large as median one, and larger than the anterior one. Antero-ventral and postero-ventral carinae of profemora with

slight elevations, meso- and metafemora with two to three small lamellae and two tubercle-like spines subapically. Antero-dorsal carina of protibiae with two indistinct elevations. Postero-dorsal carina of meso- and metatibiae with one small lamella medially.

Measurements in Table 1.

TABLE 1. Measurements of *Hainanphasma cristata* Ho gen. nov. spec. nov.

Lengths (mm.)	Female (HT)	Female (PT)	Male (PT)
Body	51.0	48.0–52.0	35.0–42.0
Head	3.0	3.5	2.0–2.5
Antennae	15.0	16.0–18.0	12.0–15.0
Pronotum	3.5	3.5	2.5
Mesonotum	11.0	10.0–11.0	7.5–9.0
Metanotum	5.0	5.0–6.0	4.5–5.0
Median segment	2.0	2.0	1.0
Profemora	8.0	9.0	7.5–8.0
Mesofemora	8.0	7.5–8.0	6.5–7.0
Metafemora	10.0	10.0	7.0–9.0
Protibiae	8.0	7.5–8.0	6.5–8.0
Mesotibiae	7.0	7.0	5.0–7.0
Metatibiae	9.0	9.0–10.0	7.0–8.0

Eggs (Figs. 17–18). The shape of the eggs resembles those of *Planispectrum*. Capsule dark brown, near oval, punctulate, with small elevated brownish spots; bearing very sparse setae, absent in some specimens. Micropylar plate distinctly convex, laterally dilated, posterior arms surrounding the capsule but not connected to each others at the end; margin of the micropylar plate strongly elevated. Micropylar cup distinct, placed near the posterior end of the micropylar plate. Operculum oval and punctulate, conical medially and with elevated brownish spots. The eggs are naturally laid by the female holotype.

Measurements. Length 3 mm., width 2.2 mm., height 2.7 mm.

Distribution. Hainan (Jianfengling, Yinggeling, Wuzhishan, Huishan and Shangxi), China.

Etymology. “cristata” refers to the high crest on the occiput of the head.

Hainanphasma diaoluoshanensis Ho spec. nov.

(Figs. 7–9, 11, 14, 16)

Type. Holotype: ♀, Diaoluoshan National Nature Reserve, Lingshui Country, Hainan Province, China, 6.VII.2011, George Ho Wai-Chun (SYSBM, ex coll. GH).

Diagnosis. This species is similar to *Hainanphasma cristata* Ho gen. nov. spec. nov., but can be differentiated by its smaller size, three elevations on outer edge of the first antennal segment, meso- and metafemora with semicircle armature and with one lamella on dorsal carina of metatibiae.

Description. Female (Figs. 7–9, 11, 14, 16). Smaller and less robust than *H. cristata* Ho spec. nov. Body rough, tuberculate and punctulate. Covered with minute setae throughout the body. Head, pronotum, mesosternum, metasternum, ventral surface of abdomen and legs brown. Mesonotum mainly grayish brown. Metanotum grayish brown with a brown longitudinal band. Dorsal surface of abdomen grayish brown, with a brown longitudinal band running from median segment to fifth abdominal tergum.

Head: Oval. Vertex with a pair of triangular tubercles behind the bases of the first antennal segment and following with a spine-like tubercle; the anterior paired tubercles about 3 x larger than the posterior pair. Occiput conically elevated with a crest, consisting out of four distinct carinae, surfaces slightly punctulate, dorsal carinae with granules and tubercles, apex of the crest slightly emarginate. Eyes rounded, rufous brown. Genae with a short

postocular carina. Antennae brown, with darker apices and mottlings on some segments, not surpassing apices of protarsi, with 24 segments. The first segment broad, triangular in cross section, with distinct median carina, slightly as long as the combined length of third and fourth segment, outer edge with two spine-like tubercles placed before middle and with a rounded tubercle placed at the middle. Second segment slightly shorter than third segment; apical segment as long as the third segment, very setose. Fourteen segment with a minute black spine on dorsal surface, pointing anteriorly.

Thorax: Pronotum square, as long as wide, with an elevation surrounded by four short blunt spines before a transverse sulcus and with two short longitudinal carinae placed behind the transverse sulcus. Posterior margin with six small granules, the median pair placed at the end of the two longitudinal carinae. Mesonotum parallel-sided, anterior margin carinate and broadly incurved, median carina indistinct. Lateral margins carinate with a row of minute pits. Antero-lateral angles of the mesonotum with a small granule. Mesopleura with four small granules marginally. Metasternum with few small granules. Metanotum about 2 x shorter than mesonotum, with nine to thirteen small pits along lateral margins and with a pair of small anterior granules.

Abdomen: Median segment with two posterior granules and few small pits along lateral margins. Sixth and seventh terga with two black depressions. Second to eighth terga with few small pits near lateral margins; with x-shaped carina medially, strongly elevated at fifth tergum. Ninth tergum with a crest-like structure medio-posteriorly, margin of the crest unarmed, apex slightly emarginate, almost reaching the end of the anal segment. Anal segment rectangular, with one granule near lateral margins, posterior margin slightly emarginate. Subgenital plate rounded, not projecting over the end of the anal segment, medially carinate, with granules near the posterior region, posterior margin truncate and thick-built. Cerci invisible, presumably very small and flattened as in *Hainanphasma cristata* Ho spec. nov.

Legs: Short and thick. Profemora as long as mesofemora, curved basally, all carinae with two to three indistinct lamellate elevations. Dorsal carinae of protibiae with two indistinct lamellate elevations. Antero-dorsal carina of mesofemora with one small lamella basally. Postero-dorsal carina of meso- and metafemora with three distinct lamellae, median one as large as posterior one and larger than anterior one. Antero-ventral carina of meso- and metafemora with two spine-like tubercles subapically. Postero-dorsal carina of meso- and metatibiae with one small lamella medially.

Male. Unknown.

Female measurements in Table 2.

TABLE 2. Measurements of *Hainanphasma diaoluoshanensis* Ho gen. nov. spec. nov.

Lengths (mm.)	Female (HT)
Body	42.0
Head	3.5
Antennae	13.0
Pronotum	3.0
Mesonotum	9.0
Metanotum	4.5
Median segment	1.5
Profemora	7.0
Mesofemora	7.0
Metafemora	8.0
Protibiae	6.5
Mesotibiae	6.0
Metatibiae	8.0

Distribution. Hainan (Diaoluoshan), China.

Etymology. This species is named after the type-locality, the Diaoluoshan National Nature Reserve.

Genus *Orestes* Redtenbacher, 1906

Type-species. *Orestes verruculatus* Redtenbacher, 1906: 47 (= *O. mouhotii*), by original monotypy.

Diagnosis. Medium-sized. Body cylindrical and slender. Head slightly convex. Antennae distinctly longer than profemora. Thorax lacking median carina. Mesonotum parallel-sided. Legs thick-built, postero-dorsal carina with small serrations.

Notes. Only one species is known. Redescription of the genus was provided by Zompro (2004).

Orestes mouhotii (Bates, 1865)

(Fig. 19)

Acanthoderus mouhotii, Bates, 1865: 342.

Datames mouhotii, Stål, 1875: 93.

Kirby, 1904: 400.

Brock, 1995: 95.

Brock, 1999: 139, fig.182. [Egg description]

Datames mouhotii, Redtenbacher, 1906: 53. [= *Orestes mouhotii* (Bates, 1865), misspelling]

Shiraki, 1935: 25 [Misidentification, not present in Japan].

Seow-Choen *et al.*, 1994: 12. [Illustration]

Okada, 1999: 47. [Misidentification, not present in Japan]

Hua, 2000: 31.

Orestes mouhotii, Seow-Choen, 1997: 126.

Pylaemenes mouhotii, Seow-Choen, 2000: 39, pl.100.

Orestes mouhotii, Brock, 2003: 70.

Zompro, 2004: 222, figs.12: 4l & 4d, 132a, 132b. [First description and illustration of male]

Otte & Brock, 2005: 237.

Seow-Choen, 2005: 104. [Illustration]

Hennemann *et al.*, 2008: 43.

Type. Holotype: Nymph ♀, Chantaboun, Camboja, leg. M. Mouhot (UMO). [Assessed using Phasmida Species File Online's images]

= *Dares fulmeki*, Werner, 1934: 1. [Synonymised by Brock, 1998: 30]

= *Dares subcylindricus*, Redtenbacher, 1906: 56. [Synonymised by Zompro, 2004: 222]

= *Orestes verruculatus*, Redtenbacher, 1906: 47, pl.1: 12. [Synonymised by Zompro, 2004: 222]

Other specimen examined. Adult ♀, Xishuangbanna, Yunnan Province, China, I.2009, Chen Chang-Qing (HBU).

Diagnosis. Related to *Hainanphasma cristata* Ho gen. nov. spec. nov., but this species is separated by occiput lacking high crest and only postero-dorsal carina of metafemora with indistinct lamellae in female; fourth and fifth abdominal terga lacking hump and postero-dorsal carina of meso- and metafemora only with one to two small teeth in male.

Notes. The male was firstly described and illustrated by Zompro (2004: 223). This species was considered to be misidentified in China (Hennemann *et al.* 2008: 43). The adult specimen (Fig. 19) examined in this study was collected from Yunnan Province that proves the occurrence of this species in China. Measurements are given based on the Chinese material in Table 3.



FIGURES 19. Habitus of *Orestes mouhotii* (Bates, 1865), female, Xishuangbanna, Yunnan Province, China [scale bar 5 mm].

Distribution. Yunnan (Xishuangbanna), China. Also found in Peninsular Malaysia, Sumatra, Singapore, Cambodia, Thailand and Vietnam.

TABLE 3. Measurements of *Orestes mouhotii* (Bates, 1865).

Lengths (mm.)	Female
Body	53.0
Head	5.0
Antennae	13.0
Pronotum	4.0
Mesonotum	11.0
Metanotum	5.5
Median segment	1.5
Profemora	9.0
Mesofemora	7.0
Metafemora	9.0
Protibiae	8.0
Mesotibiae	6.0
Metatibiae	8.0

Genus *Planispectrum* Rehn & Rehn, 1939

Type-species. *Platymorpha cochinchinensis* Redtenbacher, 1906: 46 [= *Planispectrum cochinchinensis*], by original designation.

= *Platymorpha* Redtenbacher, 1906: 46. [Preoccupied by *Platymorpha* Jacoby, 1888 (Coleoptera), replacement name proposed by Rehn and Rehn 1939: 484]

= *Platyphasma* Uvarov, 1940: 116. [Synonymised by Brock 1995: 96]

Diagnosis. Smallest Dataminae. Unique from other genera by smaller size and flattened body. Antennae slightly longer than profemora, never surpassing apices of protibiae.

Notes. Only two species are found in the southern China. *Planispectrum hongkongense* Zompro, 2004 from Hong Kong is the most northern distribution range of the genus.

Species included from China:

- 1. *Planispectrum hainanensis* (Chen & He, 2008: 359, fig. 322: A–C). [China (HN)]
[*Pylaemenes*] comb. nov.
- 2. *Planispectrum hongkongense* Zompro, 2004: 235, figs. 12: 5 & 135: f. [China (HK)]

Key to *Planispectrum* Rehn & Rehn from China:

- 1. Posterior margin of the anal segment slightly emarginate, legs lacking setae, antero-dorsal and postero-dorsal carinae of meso- and metafemora with slight fin-like lamellae *P. hongkongense* Zompro, 2004
- Posterior margin of the anal segment strongly emarginate, legs with short and brownish setae, antero-dorsal and postero-dorsal carinae of meso- and metafemora with distinct fin-like lamellae *P. hainanensis* (Chen & He, 2008) comb. nov.

***Planispectrum hainanensis* (Chen & He, 2008) comb. nov.**

(Figs. 20–23, 25–26)

Pylaemenes hainanensis, Chen & He, 2008: 359, fig. 322: A–C.

Type. Holotype: ♀, Jianfengling, Hainan Province, China, 12.XI.1983, Chen Zhen-Yao (SYSBM).

Other specimens examined. [7 males, 5 females, 12 eggs] 2♀♀, 6 eggs, Yinggezui, Yinggeling Nature Reserve, Baisha Country, Hainan Province, China, 27.IX.2010, George Ho Wai-Chun (GH); 1♂, 2♀♀, 6 eggs, Bawangling National Nature Reserve, Changjiang Country, Hainan Province, China, 9.V.2011, George Ho Wai-Chun (GH); ♂♀, Exianling Limestone Forest, Dongfang Country, Hainan Province, China, 12.VI.2011, George Ho Wai-Chun (GH); ♂, Yinggeling Nature Reserve, Baisha Country, Hainan Province, China, 17.VI.2011, George Ho Wai-Chun (GH); 2♂♂, Shangxi Nature Reserve, Wanning Country, Hainan Province, China, 4.VII.2011, George Ho Wai-Chun (GH); 2♂♂, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China, 11.VII.2011, George Ho Wai-Chun (GH).

Diagnosis. This species is allied to *Planispectrum hongkongense* Zompro, 2004 [Hong Kong, China] but differs by strongly emarginate posterior margin of anal segment, legs with short brownish setae and distinctly lamellate meso- and metafemora.

Description. Male (Figs. 20–22). Smaller and thinner than female. Dark brown. Body rough and punctulate.

Head: Rounded. Occiput slightly convex, with two rows of six short tubercles. Median furrow distinct. Eyes oval, shorter than the second antennal segment, with a short carina behind eyes. Antennae with 16 segments, almost reaching apices of protibiae, dark brown as body, but subapical and apical segments light brown. The first segment broadened, median carina slightly elevated, with two short tubercles on the outer edge, the anterior one longer than the posterior one; second segment about a half the length of the first segment. Third segment cylindrical, shorter than the second segment. Fourth to tenth segment disc-like. Apical segment almost as long as the first segment, apices pointed.

Thorax: Obviously punctulate. Pronotum as long as or slightly longer than head, anterior margin incurved, posterior margin truncate, gradually expanded posteriorly, with two rows of two humps before transverse sulcus. Mesonotum parallel-sided, with a short blackish carina antero-laterally and with a distinct median line and two flattened humps at the posterior margin. Metanotum broader than long, 2 x length of median segment, with v-shaped carina at posterior margin.

Abdomen: Ventral surface less punctured than thorax, not punctured on dorsal surface. Median segment with x-shaped carina medially. Second to ninth terga with an x-shaped carina medio-posteriorly and a short lateral carina. Anal segment broadly emarginated at posterior margin. Poculum with an indistinct median carina, posterior margin broad. Cerci small and flattened, semicircular, apices rounded, surpassing the posterior margin of the poculum.

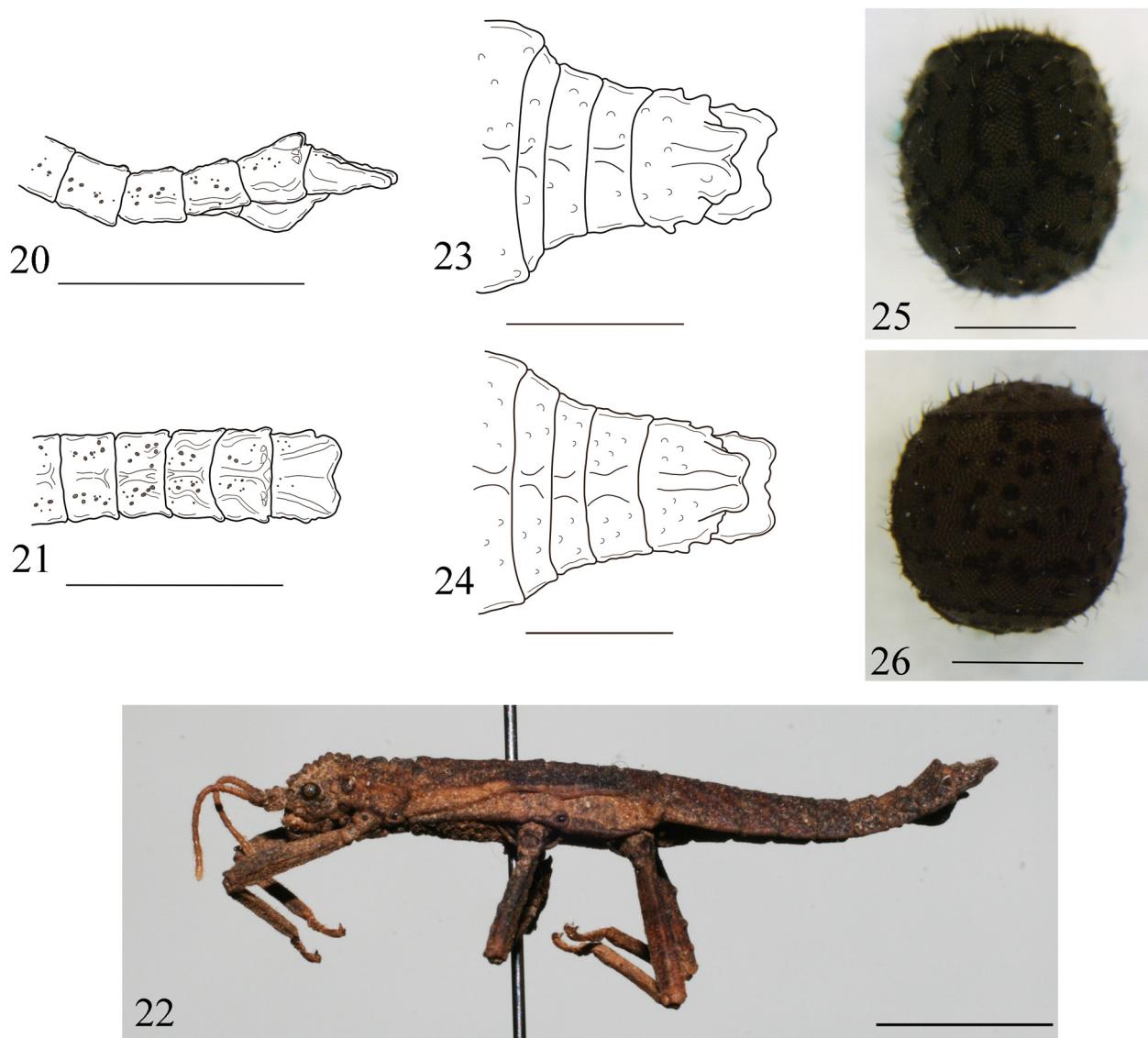
Legs: Covered with indistinct and short brownish setae. Lacking distinct armature. Antero-dorsal and postero-dorsal carinae of meso- and metafemora slightly elevated with lobes.

Female (Figs. 23). Larger and robust than the male. Brown. Thorax and abdomen dorso-ventrally flattened, covered with short setae, granules and tubercles.

Head: Rounded. Occiput convex, with short tubercles. Eyes rounded, longer than the second antennal segment, with a short carina behind eyes. Antennae with 18 segments, just surpassing the apices of profemora. The first segment broad, triangular in cross section, outer edge with two spine-like tubercles, 3 x length of second segment.

Thorax: Surface rough. Pronotum trapezoid, broader than head, anterior margin curved inward. Mesonotum moderately expanded posteriorly, longer than the combined length of head and pronotum, anterior margin elevated. With distinct median carina, posterior apex bifurcated. Metanotum almost parallel-sided, 2 x length of median segment, as broad as the posterior margin of mesonotum.

Abdomen: Median segment as broad as metanotum, with x-shaped carina. Second to eighth terga with x-shaped carina medially. Eighth and ninth terga with a short tubercle postero-laterally. Second to fifth terga equal in length and width. Sixth and seventh terga tapering posteriorly. Ninth tergum with crest-like structure medio-posteriorly, posterior apex emarginate. Anal segment with broad emargination posteriorly, shorter than ninth tergum. Subgenital plate short, reaching middle of the anal segment, with median and lateral carinae. Cerci invisible.



FIGURES 20–26. *Planispectrum* spp. **20.** *P. hainanensis* (Chen & He, 2008) **comb. nov.**, male, apex of abdomen, lateral view [scale bar 5 mm]. **21.** *P. hainanensis* (Chen & He, 2008) **comb. nov.**, male, apex of abdomen, dorsal view [scale bar 5 mm]. **22.** *P. hainanensis* (Chen & He, 2008) **comb. nov.**, habitus of male, Jianfengling National Nature Reserve, Ledong Country, Hainan Province, China [scale bar 5 mm]. **23.** *P. hainanensis* (Chen & He, 2008) **comb. nov.**, female, apex of abdomen, dorsal view [scale bar 5 mm]. **24.** *P. hongkongense* Zompro, 2004, female, apex of abdomen, dorsal view [scale bar 5 mm]. **25.** *P. hainanensis* (Chen & He, 2008) **comb. nov.**, egg capsule, dorsal view [scale bar 1 mm]. **26.** *P. hainanensis* (Chen & He, 2008) **comb. nov.**, egg capsule, lateral view [scale bar 1 mm].

Legs: Thick and short. Covered with short brownish setae. Profemora shorter than antennae, slightly curved basally, dorsal carinae with slight elevations. Antero-dorsal and postero-dorsal carinae of meso- and metafemora elevated with small lobes.

Male measurements in Table 4.

Eggs (Figs. 25–26). Capsule dark brown, with blackish spots, oval-shaped, posterior pole rounded; surface densely punctulate and sparsely covered with pale setae. Operculum nearly rounded, punctured as capsule, with blackish spots. Collar black. Micropylar plate shape like reverse ‘Y’, both ends diverging and surrounding the capsule, but both ends not connected; margin of the plate black. Micropylar cup small, placed at the anterior apex of median line. Median line distinct, nearly reaching to the posterior pole.

Measurements. Length 2 mm, width 1.8 mm, height 2 mm.

Notes. Chen and He (2008: 359) originally placed this species in *Pylaemenes* Stål, 1875. By examination of

the type, the small size and flattened body are diagnostic for *Planispectrum* and here transferred. The male and eggs are described for the first time.

Distribution. Endemic to Hainan (Jianfengling, Yinggeling, Bawangling, Exianling and Shangxi), China.

TABLE 4. Measurements of *Planispectrum hainanensis* (Chen & He, 2008) **comb. nov.**

Lengths (mm.)	Male
Body	18.0–20.5
Head	1.8
Antennae	4.0–4.5
Pronotum	1.8–2.0
Mesonotum	3.0–3.5
Metanotum	1.5–2.0
Median segment	0.8–1.0
Profemora	3.0
Mesofemora	2.5–3.0
Metafemora	3.5
Protibiae	2.8–3.0
Mesotibiae	2.0–2.5
Metatibiae	2.8–3.0

***Planispectrum hongkongense* Zompro, 2004**

(Fig. 24)

Planispectrum hongkongense, Zompro, 2004: 235, figs. 12: 5 & 135f.

Otte & Brock, 2005: 278.

Hennemann *et al.*, 2008: 22.

Type. Holotype: ♀, 180–380 m., au sud de Tai Po, Tai Mo Shan Country Park, New Territories, Hong Kong, 2.XII.1988, leg. B. Hauser, BRU-88/56 (MHNG). [Assessed from the original description and figures, also Phasmida Species File images]

Other specimens examined. [11 females, 9 eggs] ♀, Ma Wo, Tai Po District, Hong Kong, 24.VII.2006, Lai, S.Y.H. (TLEF); ♀, no data (HKU); ♀, Shing Mun, Hong Kong, no data, Philip Lo Yik-Fui (GH, ex coll. Philip Lo Yik-Fui); ♀, Ng Tung Chai, Hong Kong, 27.IV.2008, George Ho Wai-Chun (GH); ♀, 3 eggs, Ng Tung Chai, Hong Kong, 28.IV.2009, George Ho Wai-Chun (GH); ♀, 6 eggs, Tai Tung Shan, Lantau Island, Hong Kong, 21.V.2009, George Ho Wai-Chun (GH); ♀, Aberdeen, Hong Kong, 6.IX.2009, George Ho Wai-Chun (GH); ♀, Aberdeen, Hong Kong, 21.X.2009, George Ho Wai-Chun (GH); ♀, Tai Po Kau, Hong Kong, 14.V.2012, George Ho Wai-Chun (GH); ♀, Violet Hill, Hong Kong, 3.VI.2012, George Ho Wai-Chun (GH); ♀, Tsiu Hang, Sai Kung, Hong Kong, 5.VI.2012, George Ho Wai-Chun (GH).

Diagnosis. This species is distinctive from all other members in the genus by abdomen broader than thorax. The only allied species is *Planispectrum hainanensis* (Chen & He, 2008) **comb. nov.**, but this species is different from the latter by the gently emarginate posterior margin of the anal segment, legs lacking setae, and antero-dorsal and postero-dorsal carinae of meso- and metafemora with indistinct fin-like lamellae.

Notes. Male is not known. This species is likely to reproduce by thelytokous parthenogenesis. Very detailed description of female and egg was provided by Zompro (2004).

Distribution. Only known from Hong Kong, probably endemic.

Genus *Pylaemenes* Stål, 1875

Type-species. *Phasma (Pachymorpha) coronatum* de Haan 1842: 137, pl. 14: 4–5 [= *Pylaemenes coronatus*], by subsequent designation of Kirby 1904: 400.

= *Datames* Stål, 1875: 51, 93. [Synonymised by Hennemann 1998: 124]

= *Pyloemenes* Bradley & Galil, 1977: 198. [Misspelling]

Diagnosis. Medium to large Dataminae. Body thick-built and cylindrical. Antennae distinctly longer than profemora, surpassing apices of protibiae. Thorax distinctly carinate medially. Male armed with spines.

Notes. Since *Datames* Stål, 1875 was synonymised with *Pylaemenes* Stål, 1875 (Hennemann 1998), all the *Datames* species were transferred to the latter genus. In China, all known *Pylaemenes* are documented from female specimens. These preliminary data might indicate that males are rare, or that the concerned species represent all-female obligate parthenogens. Therefore, the key is only given to the female.

Species included from China:

- | | |
|---|---|
| 1. <i>Pylaemenes guangxiensis</i> (Bi & Li, 1994: 254, figs. 1–4). [<i>Datames</i>] | [China (FJ, HK, GD, GX & JX) & Vietnam] |
| 2. <i>Pylaemenes pui</i> Ho spec. nov. | [China (YN)] |
| 3. <i>Pylaemenes shirakii</i> Ho & Brock spec. nov. | [China (TW)] |

Key to *Pylaemenes* Stål from China (female only):

1. Occiput strongly protruding, with high crest; anterior margin of mesonotum with a cluster of short tubercles; eyes egg-shaped *P. pui* Ho spec. nov.
- Occiput not strongly protruding, with short crest; anterior margin of mesonotum lacking cluster of tubercles; eyes rounded ..
2.
 2. Mesonotum 2.5 x length of pronotum; third to fifth abdominal terga with postero-lateral tubercles *P. guangxiensis* (Bi & Li, 1994)
 - Mesonotum 3 x length of pronotum; third to fifth abdominal terga lacking postero-lateral tubercles *P. shirakii* Ho & Brock spec. nov.

Pylaemenes guangxiensis (Bi & Li, 1994)

Datames guangxiensis, Bi & Li, 1994: 254, figs. 1–4.

Chen, 1999: 46. [Illustration of adult]

Chen et al., 2002: 101.

Dares guangxiensis, Zompro, 2004: 219.

Pylaemenes guangxiensis, Brock & Okada, 2005: 24, figs. 1–5. [Not present in Japan, refer to *P. shirakii* Ho & Brock spec. nov.]

Otte & Brock, 2005: 296.

Xu, 2005: 76.

Xu, 2006: 61, fig. 13. [Illustration of egg]

Hennemann et al., 2008: 26.

Chen & He, 2008: 358, fig. 321: A–C, pl. 4: 3.

= *Pylaemenes hongkongensis* Brock & Seow-Choen, 2000: 143, fig. 11. [Synonymised by Zompro 2004: 219]

Brock, 2002: 56.

Ades & Kendrick, 2004: 62.

Datames sp., Bi et al., 2001: 255.

Type. Holotype: ♀, Longhushan, Longan Country, Guangxi Autonomous Region, China, 7.X.1991, Li Tian-Shan (SEM).

Other specimens examined. [26 females, 10 eggs] ♀, Dinghushan, Guangdong Province, China, 21.VII.1964, Hua Li-Zhong (SYSBM); Nymph ♀, Dehua, Fujian Province, China, 12.XI.1974, Yang Chi-Kun (CAU); ♀, Bobai, Guangxi Autonomous Region, China, IV.1997, unknown (BFU); Nymph ♀, Heishiding Nature Reserve,

Fengkai Country, Guangdong Province, China, 15.VII.1999, Zhou Jing (SYSBM); ♀, Tai Mo Shan, Hong Kong, 6.VII.2003, Philip Lo Yik-Fui (GH, ex coll. Philip Lo Yik-Fui); Nymph ♀, Daiwuling, Xinyi Country, Guangdong Province, China, 7–14.VIII.2003, Zhang Bing-Lan (SYSBM); ♀, Pok? [probably refers to Pok Fu Lam, west of Hong Kong Island], Hong Kong, V.1974, Hill, D.S. (HKU); Nymph ♀, Jiulianshan, Jiangxi Province, China, 14–15.VII.2002, Yu Xin (CAU); Nymph ♀, Shangkeng, Fujian Province, China, 31.V.2004, Yuan Cai-Xia & Li Jing (HBU); ♀, Hong Kong, 2008, George Ho Wai-Chun (GH); ♀, Tai Mo Shan, Hong Kong, 2008, George Ho Wai-Chun (GH); ♀, Tai Po Kau, Hong Kong, 2008, George Ho Wai-Chun (GH); ♀, Tai Mo Shan, Hong Kong, 21.VI.2008, George Ho Wai-Chun (GH); ♀, Tai Po Kau, Hong Kong, IV.2008, George Ho Wai-Chun (GH); 2♀♀, Ng Tung Chai, Hong Kong, 20.IX.2008, George Ho Wai-Chun (GH); ♀, Tai Mo Shan, Hong Kong, 13.XII.2008, George Ho Wai-Chun (GH); Nymph ♀, Hong Kong, 2009, George Ho Wai-Chun (GH); ♀, Heishiding Nature Reserve, Fengkai Country, Guangdong Province, China, 14.VI.2009, Han Xiao-Lei (SYSBM); ♀, Yueyun, Shaoguan Country, Guangdong Province, China, 1.V.2009, George Ho Wai-Chun (GH); ♀, Ng Tung Chai, Hong Kong, 29.VI.2010, George Ho Wai-Chun (GH); 2♀♀, 1 nymph ♀, Xidaimingshan Nature Reserve, Guangxi Autonomous Region, China, 24–25.V.2011, George Ho Wai-Chun (GH); Nymph ♀, Heishiding Nature Reserve, Fengkai Country, Guangdong Province, China, 25–27.VIII.2011, George Ho Wai-Chun (GH); 3♀♀, 10 eggs, Heishiding Nature Reserve, Fengkai Country, Guangdong Province, China, 21.VIII.2012, George Ho Wai-Chun (GH); ♀, Hoa Binh, Tonkin (North Vietnam), no data, leg. A. de Cooman (IZCAS).

Diagnosis. This species is allied to *Pylaemenes shirakii* Ho & Brock **spec. nov.**, but can be separated from the latter by smaller size, mesonotum only 2.5 x length of pronotum and third to fifth abdominal terga with postero-lateral tubercles.

Notes. Bi and Li (1994) originally placed this species in *Datames* Stål, 1875. Zompro (2004) combined this species to *Dares* Stål, 1875 and later Brock and Okada (2005) transferred it to *Pylaemenes* Stål, 1875. The species, *Pylaemenes hongkongensis* Brock & Seow-Choen, 2000 [Type from Hong Kong], was synonymised under the present species by Zompro (2004: 219).

The record of this species from Japan (Brock & Okada, 2005) is misidentified and should refer to *Pylaemenes shirakii* Ho & Brock **spec. nov.** described in this study. The records of this species from Hainan is probably misidentified (Chen *et al.* 2002: 102; Hennemann *et al.* 2008: 24) and should refer to the new genus and new species, *Hainanphasma cristata* Ho **gen. nov. spec. nov.**, described in this study. The specimen from Hoa Binh, North Vietnam deposited in IZCAS is well-matched with this species which is the first record from Vietnam and outside the range of China.

In Hong Kong, it was usually found feeding on Rough Pellionia *Pellionia scabra* Benth. [Urticaceae], Anti-febrile Dichroa *Dichroa febrifuga* Lour. [Hydrangeaceae], Nodding Wikstroemia *Wikstroemia nutans* Champ. ex Benth. [Thymelaeaceae] and Rusty-haired Raspberry *Rubus reflexus* Ker Gawl. [Rosaceae] in the wild.

Distribution. Type from Guangxi. Mainly found in the southern China: Hong Kong (New Territories, Hong Kong Island, Lantau Island and Lamma Island), Guangdong (Dinghushan, Daiwuling, Heishiding and Shaoguan), Guangxi (Longhushan and Xidaimingshan), Jiangxi (Jiulianshan) and Fujian (Dehua and Shangkeng). Also known from North Vietnam (Hoa Binh).

Pylaemenes pui Ho **spec. nov.**

(Figs. 27–28)

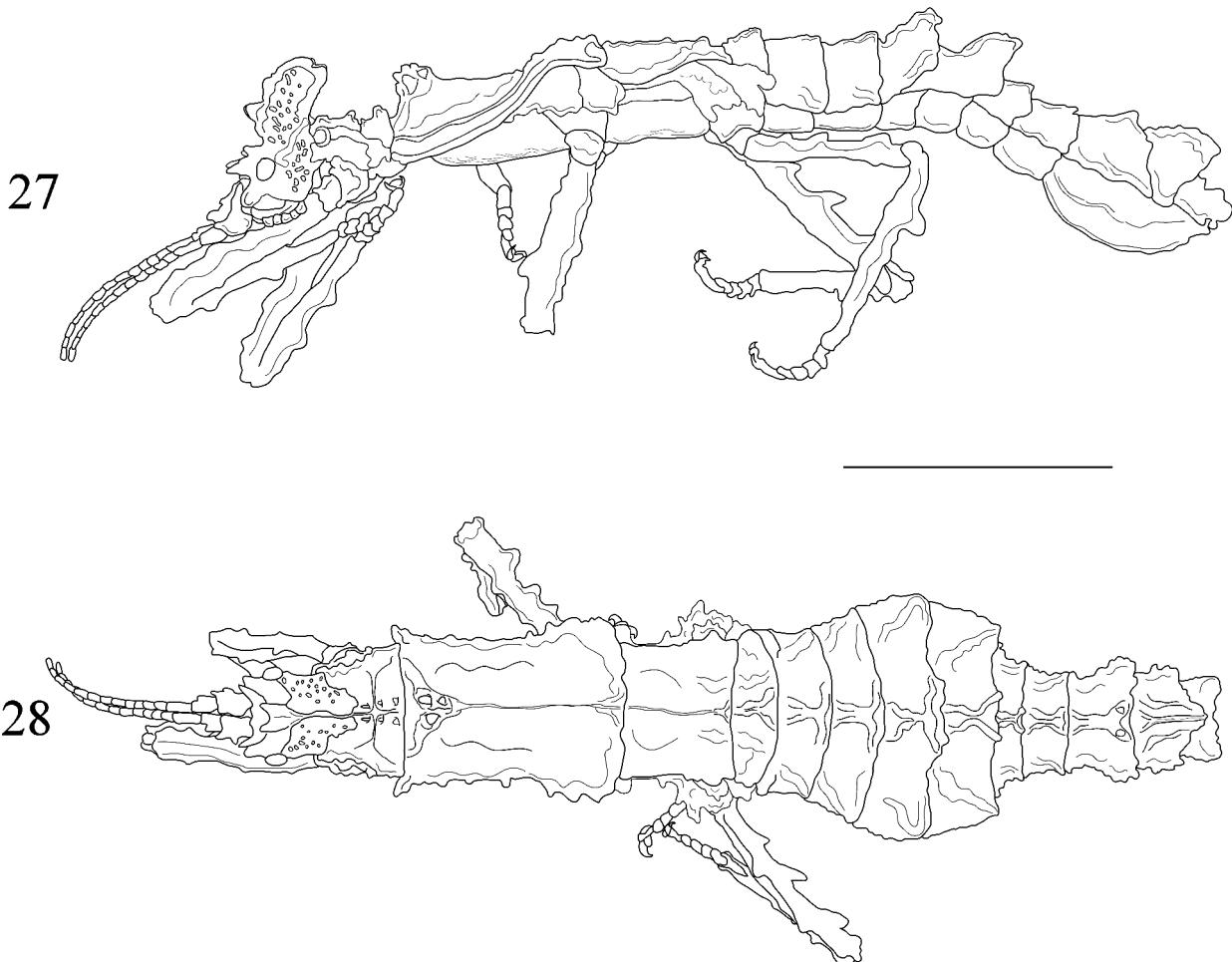
Type. Holotype: ♀, Caiyanghe Nature Reserve, Puer Country, Yunnan Province, China, 29.VII.2007, Jia Feng-Long, En-382564 (SYSBM).

Diagnosis. Related to *Pylaemenes guangxiensis* (Bi & Li, 1994), but differs by its smaller size, egg-shaped eyes and mesonotum elevated with a cluster of tubercles antero-medially.

Description. Female (Figs. 27–28). General colour of body and legs light brown to brown. Smallest Chinese *Pylaemenes*. Body robust and rough, with tubercles of irregular size. Head and legs densely covered with brownish setae, but less distinct on thorax and abdomen.

Head: Oval. Occiput strongly projecting posteriorly, cone-like, deep v-shaped in dorsal view, lateral surface punctulate, with a shallow notch apically. Vertex with a pair of pointed horns placed behind the bases of antennae. Eyes small, egg-shaped. Antennae broken, only 15 segments remained, covered with short setae, longer than

profemora. The basal two segments dark brown, light brown from third to apical segments, all segments with dark brown median line. The first segment very broad, with distinct carina, longer than third segment, with two tubercles on outer edge, the anterior one placed near the apex and the posterior one placed at the middle of the segment. Second segment cylindrical and flattened, with one tubercle near the apex. Third segment slightly longer than the second segment. The remaining fourth to fifteenth segments roughly about the same length, shorter than the second segment, disc-like.



FIGURES 27–28. *Pylaemenes pui* Ho spec. nov. [scale bar 10 mm]. **27.** HT female, lateral view. **28.** HT female, dorsal view.

Thorax: Pronotum short, trapezoid, about one-third length of mesonotum, anterior margin curved inward, with three pair of tubercles along longitudinal sulcus, lateral margins with two short tubercles. Mesonotum longer than the combined length of pronotum and metanotum, median line indistinct. Anterior apex with a cluster of five short and blunt tubercles. Posterior margin with four short tubercles medially. Antero-lateral angles with a fin-like tubercle. Lateral margins with two to three short tubercles before middle. Postero-lateral region strongly elevated laterally, with a short tubercles on the elevated margin. Metanotum 3 x length of median segment, median carina distinct, posterior apex of the carina forked; hind part of the metanotum strongly elevated laterally as in the mesonotum, with a fin-like tubercle and two to three short tubercles on the elevated margin. Mesosternum and metasternum sparsely covered with small granules, with distinct median carina. Mesopleura with three to four small tubercles on the lateral margin. Metapleura with a fin-like tubercle and two short tubercles.

Abdomen: Median segment narrow, about 4 x broader than long, elevated with an x-shaped carina medially. Second to fourth terga broadened posteriorly, narrowing strongly from fifth to sixth terga. Fourth tergum broadest. Sixth tergum to anal segment roughly about the same width. From second to seventh terga with short carina laterally. Fourth to seventh terga with x-shaped elevations medio-posteriorly. Eighth tergum longer than ninth tergum with two elevations medio-posteriorly. Eighth and ninth terga slightly flanged postero-laterally. Ninth tergum with crest-like structure posteriorly. Anal segment shorter than ninth tergum, with distinct median carina,

posterior margin apparently emarginate medially. Subgenital plate boat-shaped, not surpassing the end of the anal segment, with distinct median and lateral carinae. Cerci slightly exposed, very short and flattened, apices rounded.

Legs: Light brown with blackish mottling. Dorsal surface of all femora with small pits. Profemora slightly curved basally, antero-dorsal carina armed with three small elevations, all roughly equal in size; postero-dorsal carina with four to five small elevations. Antero-dorsal and postero-dorsal carinae of meso- and metafemora roughly protruded into three fin-like lamellae, anterior ones larger than others. Antero-ventral and postero-ventral carinae of mesofemora with a small spine-like serration subapically. Antero-ventral and postero-ventral carinae of metafemora with two spine-like serrations subapically. Antero-dorsal and postero-dorsal carinae of meso- and metatibiae with two fin-like lamellae. Antero-ventral and postero-ventral carinae of meso- and metatibiae with two indistinct elevations. The lamellae on postero-dorsal carina of meta- and metatibiae distinctly larger than the lamellae on antero-dorsal carina.

Male. Unknown.

Measurements in Table 5.

TABLE 5. Measurements of *Pylaemenes pui* Ho spec. nov.

Lengths (mm.)	Female (HT)
Body	38.5
Head	3.5
Antennae	10.0
Pronotum	2.5
Mesonotum	8.0
Metanotum	4.5
Median segment	1.5
Profemora	7.0
Mesofemora	7.0
Metafemora	8.0
Protibiae	7.0
Mesotibiae	6.5
Metatibiae	8.0

Distribution. Yunnan (Caiyanghe), China.

Etymology. This new species is named in honour and memory of Professor Pu Zhelong, an academician of the Chinese Academy of Sciences and Zhongshan University, Guangzhou for his huge contributions to the entomology of China.

Pylaemenes shirakii Ho & Brock spec. nov.

(Figs. 29–31)

Datames sp., Huang, 2002: 82.

Li, 2009: 40.

Type. Holotype: ♀, Taipei City, Taiwan, 2.X.2009, George Ho Wai-Chun (HKES).

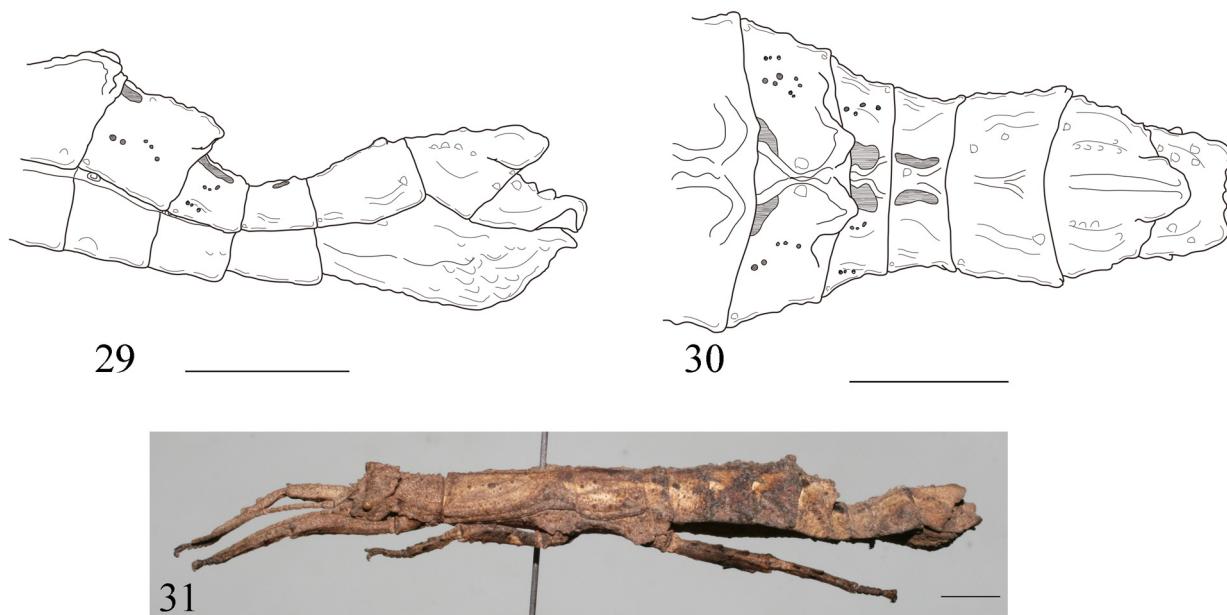
Diagnosis. This new species is similar to *Pylaemenes guangxiensis* (Bi & Li, 1994), but differs by its larger size, metanotum 4 x length of median segment, third to fifth abdominal terga lacking postero-lateral tubercles and the truncate posterior margin of the subgenital plate.

Description. Female (Figs. 29–31). General colour of body and legs brown. Medium-sized *Pylaemenes*.

Head: Rounded. Vertex with two short spine-like tubercles between the bases of the antennae. Occiput elevated with a short crest-like structure, with four carinae, broad v-shape in dorsal view. Posterior margin with six small granule-like swellings. Eyes light brown, rounded and prominent. Antennae with 24 segments, densely covered

with short setae, surpassing apices of protibiae, almost as long as the combined length of pronotum and mesonotum. The first segment broad, triangular in cross section, elevated with two spine-like tubercles on outer edge, the anterior one placed near the apex and the posterior one placed at the middle of the segment. Second segment almost as long as third segment. Apices of apical segment pointed.

Thorax: Pronotum nearly square, slightly broader than long, longer than head, with an elevation surrounded by four short blunt spines placed before transverse sulcus; two short longitudinal carinae placed behind the transverse sulcus, with three small granules on the carina. Mesonotum 3 x length of pronotum, gently expanded posteriorly, indistinctly carinate medially. Lateral margins with few blackish granules and pits. Metanotum broader than long, 4 x length of median segment, with small pits along lateral margins. Meso- and metapleura with three to five small granules along lateral margins, postero-lateral angle with a small tuberculate elevation. Meso- and metasternum with few small granules.



FIGURES 29–31. *Pylaemenes shirakii* Ho & Brock spec. nov. **29.** HT female, apex of abdomen, lateral view [scale bar 5 mm]. **30.** HT female, apex of abdomen, dorsal view [scale bar 5 mm]. **31.** Habitus of HT female, Taipei, Taiwan [scale bar 5 mm].

Abdomen: Rough surface, with short wrinkles and granules. Median segment 4 x broader than long. Fourth to sixth terga with x-shaped carina posteriorly. Fourth tergum broadest. Second to fourth terga broadened posteriorly, fifth to seventh terga narrowing posteriorly. Eighth tergum broadest among the three terminal terga. Ninth tergum with crest-like structure posteriorly, apex pointed and not emarginate apically, reaching middle of the anal segment. Anal segment almost as long as ninth tergum, broadly emarginate at posterior margin, lateral margins with a short tubercle medially, postero-lateral angles elevated and rounded. Subgenital plate reaching posterior margin of the anal segment, median carina thick, with short wrinkles, posterior margin truncate and elevated. Cerci small, not exposed behind the anal segment.

Legs: Brown, mesofemora with a pale marking near the base. Profemora curved basally, broadened in second half, postero-dorsal carina with three elevations; antero-dorsal carina and antero-ventral carinae lacking armature. Antero-dorsal carina of protibiae with one small and slight elevation medially, ventral carinae lacking armature. Postero-dorsal carina of meso- and metafemora with three fin-like lamellae, anterior one largest. Antero-dorsal carina of meso- and metafemora with two indistinct small elevations. Antero-dorsal carina of meso- and metatibiae with one fin-like lamella medially. Postero-dorsal carina of all tibiae with two fin-like lamellae, anterior one larger than posterior one. Antero-ventral and postero-ventral carinae of meso- and metafemora with four to five small and slight elevations. Antero-ventral and postero-ventral carinae of meso- and metatibiae slightly waved.

Male. Unknown.

Measurements in Table 6.

TABLE 6. Measurements of *Pylaemenes shirakii* Ho & Brock **spec. nov.**

Lengths (mm.)	Female (HT)
Body	51.0
Head	3.2
Antennae	13.0
Pronotum	3.5
Mesonotum	10.5
Metanotum	6.0
Median segment	1.5
Profemora	8.5
Mesofemora	6.5
Metafemora	8.0
Protibiae	7.0
Mesotibiae	5.5
Metatibiae	7.0

Notes. Several authors (Shiraki 1935: 25; Cai 1987: 26; Hua 2000: 31; Brock & Okada 2005; Xu 2005: 76) mentioned the distribution of *Orestes mouhotii* [Type originally collected from Cambodia, also found in the southwestern China and several countries of South-East Asia] and *Pylaemenes guangxiensis* (Bi & Li, 1994) [Type from Guangxi, China] from Taiwan. By examining the material from Taiwan, it represents a distinct species and refers to this new species.

Distribution. The distribution of this species is known from most areas below 1000 meters in Taiwan (Huang 2002: 82).

Etymology. Named in honour and memory of Dr Tokuichi Shiraki for his contribution to the entomology of Taiwan.

Discussion

In this study, the members of the phasmatodean subfamily Dataminae Rehn & Rehn, 1939 of China are reviewed. A total of four genera and eight species are discussed. One genus and four species, *Hainanphasma cristata* Ho **gen. nov. spec. nov.**, *H. diaoluoshanensis* Ho **spec. nov.**, *Pylaemenes pui* Ho **spec. nov.** and *P. shirakii* Ho & Brock **spec. nov.**, are described as new. A new combination is proposed for *Planispectrum hainanensis* (Chen & He, 2008) **comb. nov.** which was originally placed in *Pylaemenes* Stål, 1875. After these additions and new combination, thirty-six species in eight genera are currently known in the Dataminae worldwide (Brock 2013).

In China, Hainan is the area of the highest species diversity of the Dataminae (3 species) (Table 7). One genus (25% of the Chinese genera) and three species (35% of the Chinese species) from the subfamily are endemic to the island, which is geographically isolated from southern mainland China and is the largest tropical island in China. The endemic genus, *Hainanphasma* **gen. nov.**, is morphologically related to *Orestes* Redtenbacher, 1906 and *Pylaemenes* Stål, 1875. It differs from both by the elongate body and slender antennae. From *Orestes*, it is readily distinguished by projecting posteriorly and punctulate occipital crest in female and distinctive hump on fourth and fifth abdominal terga in male. From *Pylaemenes*, it is distinguished by parallel-sided thorax in female and unarmed thorax in male. Egg structure of *Hainanphasma* **gen. nov.** is different from all other genera in the subfamily. It is characterized by punctulate capsule and strongly elevated micropylar plate. In fact, the shape of the eggs resembles those of *Planispectrum* Rehn & Rehn, 1939 but *Hainanphasma* **gen. nov.** is morphologically distinguished by cylindrical body and longer antennae. Two species, *H. cristata* Ho **spec. nov.** and *H. diaoluoshanensis* Ho **spec. nov.** are recognized in this genus. The latter is known only from Diaoluoshan, which is situated in the southeastern Hainan and isolated from other mountains of the island. Although *H. diaoluoshanensis* Ho **spec. nov.** is currently known from only a single female specimen, it is treated as a full species in the present study. It is supported by a

recent study on Hainan Neohiraseini (Hennemann & Conle, 2008 [Phasmatidae: Lonchodinae]) that some newly discovered phasmatodean taxa including one new genus (*Neoqiongphasma* Ho, 2013), two new species (*N. diaoluoshanensis* Ho, 2013 and *Qiongphasma bispinosus* Ho, 2013) and one new subspecies (*Q. b. bispinosus* Ho, 2013) are restricted to Diaoluoshan and not found elsewhere in Hainan (Ho 2013). An undescribed species of *Ramulus* Saussure, 1862 [Phasmatidae: Clitumninae] from the mountain is also in preparation by the author. Apparently, the phasmid fauna of the Diaoluoshan has its own evolutionary history. In fact, further material including unknown male and egg of *H. diaoluoshanensis* spec. nov. is needed in order to further promote our knowledge of the genus.

TABLE 7. Comparison of Chinese provinces / administrative regions with the number of genera and species of Dataminae.

Provinces / administrative regions	Genera	Species
Hainan	2	3
Hong Kong	2	2
Taiwan	2	2
Yunnan	2	2
Fujian	1	1
Guangdong	1	1
Guangxi	1	1
Jiangxi	1	1

Dataminae is a small group of phasmid in China. The aspect of biology such as their ecology, behavior and foodplant preferences is poorly known. An additional research is necessary to learn more about these aspects.

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