

Taxonomy and synonymy of *Phyllothelys* Wood-Mason (Dictyoptera: Mantodea)

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Abstract. The different species successively described in the genera *Phyllothelys* Wood-Mason and *Kishinouyeum* Ôuchi independently created, but undistinguishable, are critically reviewed.

Résumé. Taxonomie et synonymie de *Phyllothelys* Wood-Mason (Dictyoptera : Mantodea). Les différentes espèces décrites successivement dans les genres *Phyllothelys* Wood-Mason et *Kishinouyeum* Ôuchi créés indépendamment, mais indiscernables, sont passées en revue de façon critique.

Keywords: Mantidae, Phyllothelyinae, *Kishinouyeum*, *Ceratocrania*, lectotypes.

When Yoshio Ôuchi created the genus *Kishinouyea* in 1938 (quickly renamed *Kishinouyeum* by himself) for a new species from China, he only compared it with *Ceratocrania* Westwood 1889, without realizing that his new species could be placed in the genus *Phyllothelys* Wood-Mason 1877. Subsequent authors, who discovered other species, have also placed them within the genus *Kishinouyeum*. Therefore, there are now 11 nominal species in *Kishinouyeum* besides the eight previously described as *Phyllothelys*, hence specific synonymies probably exist. We now establish a new generic synonymy between *Phyllothelys* and *Kishinouyeum* and review the elements required for further revision.

Material and methods

Specimens of the different species are preserved in the following institutions: ANSP, Academy of Natural Sciences, Philadelphia, USA; BAUC, Beijing Agricultural University, Beijing, China; BMNH, Natural History Museum, London, UK; DEI, Deutsches Entomologisches Institute, Müncheberg, Deutschland; DTCY, Department of Biology, Dali Teachers College, Yunnan, China; HNU, Department of Biology, Henan Normal University, China; ICRI, Zhongshan University Research Institute of Entomology, Guangdong, China; IEAS, Institute of Entomology, Academia Sinica, Shanghai, China; MNHN, Muséum national d'Histoire naturelle, Paris, France; MSNG, Museo civico di Storia naturale G. Doria, Genova, Italia; MZUF, Museo zoologico La Specola, Firenze, Italia; NAUJ, Nanjing University of Forestry, China; OXUM, University Museum, Oxford, UK; SMNK, Staatliches Museum für Naturkunde Karlsruhe, Deutschland; SMSM, Sarawak

Museum, Kuching, Malaysia; TFP, Technological Forest Product, Taipei, Taiwan; UPPC, University of the Philippines, Laguna, Philippines; ZFMK, Zoologisches Forschungsinstitut und Museum König, Bonn, Deutschland; ZMNH, Zhejiang Museum of Natural History, China; ZMUH, Zoologisches Museum und Universität, Hamburg, Deutschland; ZSIC, Zoological Survey of India, Calcutta, India.

Results

Phyllothelys Wood-Mason 1876

Phyllothelys Wood-Mason 1876b, type species *Phyllocrania westwoodi* Wood-Mason 1876a

= *Kishinouyeum* Ôuchi 1938b, type species *Kishinouyea sinensis* Ôuchi 1938a, **n. syn.**

Diagnosis. Mantidae of medium size, generally 40 to 60 mm long, brown coloured, fully winged in both sexes. **Head.** Vertex with a process 1 to 13 mm in length, ventrally flat, dorsally with inflated base, then with a median keel; frontal sclerite about as high as wide, with the top prominent; eyes rounded, ocelli large in males, small in females; antennae filiform, thick and long in males, thin and rather short in females. **Pronotum** elongate with supracoxal dilation well marked and lateral margins granulous, metazone much longer than prozone. **Forelegs** rather long; coxae shorter than pronotum, with a series of denticles on the anterior margin; femora a little longer than coxae, with the claw groove located almost medially, with external edge crenate, and four discoidal, four external and 14-17 internal spines; tibiae with 12-17 external and 13-18 internal spines; first joint of tarsi as long or a little longer than the remaining segments combined. **Mid- and hindlegs** rather short; coxae more or less elongate; femora with posterior foliaceous expansions, genicular spine short; basal part of tibiae inflated, slender apically; first joint of tarsi shorter than the remaining segments combined. **Wings** are longer than the abdomen, particularly in males; forewings with a narrow costal area, while the subcostal and median veins are well separated from the radial vein; stigma is absent, completely reduced; fore and hindwings more or less smoky and with darker

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areas. **Abdomen** slender in males, wider in females with more or less prominent lateral lobes on tergites 4 to 6. Supra-anal plate is transverse with a median carina and a rounded posterior edge; cerci are hairy, short, with the terminal joint conical. The subgenital plate of male is about as long as wide, bearing styli positioned well apart from each other. The ovipositor of females is rather long, extending beyond the cerci. **Male genitalia** with hypophallus more or less pigmented on its left edge, with a small process on its terminus; the pseudophallus with its apex somewhat widened and pigmented, while the titillator is very short and the right epiphallus without great peculiarities (see fig. 4).

Discussion

The closest related genus is *Ceratocrania* Westwood 1889, with a similar overall body shape, also exhibiting a process on the vertex, an elongated prothorax with the metazone much longer than the prozone, the external edge of fore femora crenate between spines, the mid and hind femora with posterior foliaceous expansions, the stigma absent, the presence of lateral lobes on abdominal tergites, the ovipositor surpassing the cerci, and a very short titillator. The

classification of these two genera in the same subfamily Phyllothelyinae is perfectly justified with the above set of diagnostic characters. Provisionally, we consider that this subfamily, which contains no other genera, can be placed among the Mantidae, but this point of view must be confirmed by chromosomic and molecular studies.

Ceratocrania is distinct from *Phyllothelys* by its more elongate head, more pronounced ovoid eyes, a compressed and somewhat sinuate process of vertex,

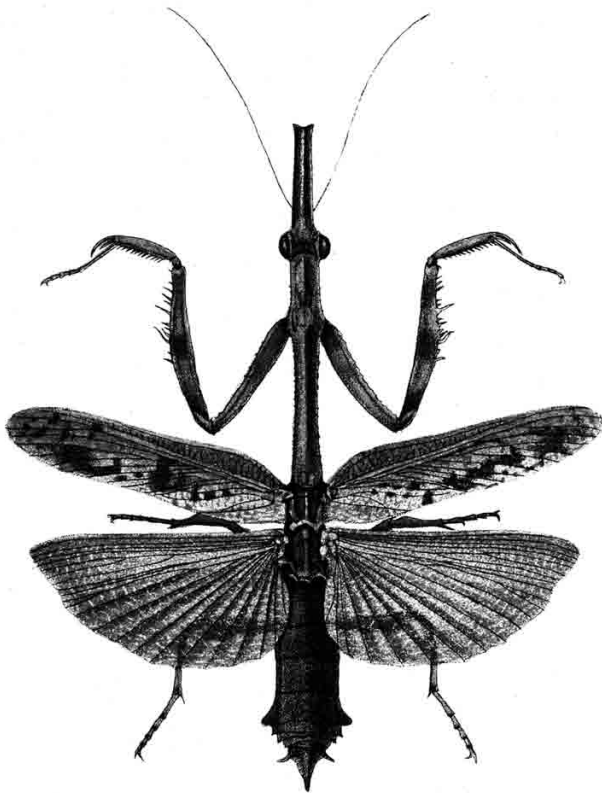


Figure 1
Phyllothelys westwoodi (Wood-Mason), ♀ lectotype, type-species of *Phyllothelys*, after Wood-Mason (1885).

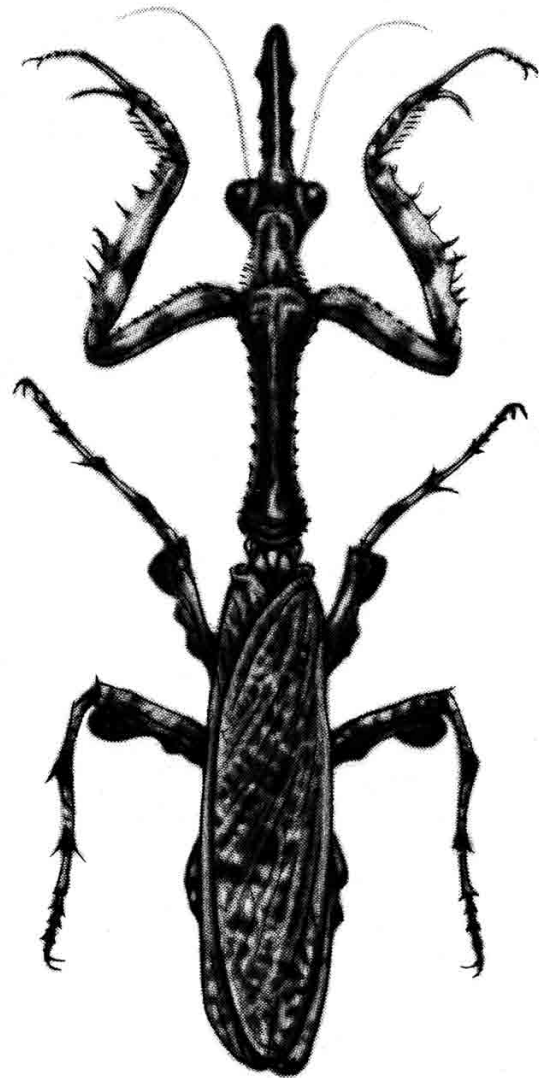


Figure 2
Kishinouyeum sinense (Ôuchi), ♀ holotype, type-species of *Kishinouyeum*, after Ôuchi (1938a).

its shorter fore tibiae such that the claw groove is positioned within the apical third of the fore femora, its lamellate mid and hind tibiae, and its bilobed pseudophallus.

History of the genus

Wood-Mason (1876b: 506-507) erected the genus *Phyllothelys* for a species that he succinctly described (1876a: 176) as *Phyllocrania westwoodi* from a female collected in “Naga Hills” as well as a male from “Bhutan Doars”. He specified “*in the former the head is provided with a long and slightly tapering foliaceous frontal horn, truncated at the apex, longitudinally obtusely carinate in front and sharply crested behind, and nearly three times as long as the head is high; in the latter this great foliaceous horn is reduced to little more than a tubercle only about half as long as the head is high*”. The types were set in ZSIC.

Wood-Mason (1877: 18) came again on the distinction of sexes for this species, very different by the process of vertex. Wood-Mason (1885: 206-209, pl. XII fig 1-2) addressed this distinction again with a very detailed diagnosis (30 lines) for the genus *Phyllothelys* and as well as detailed descriptions of the two sexes of *P. westwoodi*. This work included coloured representations with the wings spread, along with drawings of the head, fore and hind legs, and of the tip of female abdomen. The following specimens were detailed: “2 ♀ and 1 ♀ nymph, Sibsagur, Assam, 1 ♂ Buxa, Bhutan, and 1 ♂ Moolai, Upper Tenasserim in Indian Museum, Calcutta. A fine female is preserved in the British (Natural History) Museum, London”. However, it is probable that the figured male and

female do not belong to the same species, primarily due to the marked difference in the process of vertex morphology (fig. 3a). Thus, it is necessary to designate a **lectotype** for *P. westwoodi* which would logically be the female from Naga Hills (**present designation**), which was the first specimen described for the species (fig. 1). In addition, it is necessary to attribute other specific names for the two males treated by Wood-Mason as slightly different “*In the Tenasserim specimen of this sex the cephalic protuberance is more broadly rounded at the top and less produced, and the horn is more rudimentary*”.

In the same paper, Wood-Mason (1885: 209-210, pl. XII, fig. 3) subsequently described *Phyllothelys paradoxum* from a young male collected in “Burmah” and preserved in ZSIC, which he provided illustrations of the head indicating a process of vertex very different from those of the previous species (fig. 3b): “*much more thinly foliated, and jagged, instead of entire, on the edges, so as to resemble a very narrow pinnately-cleft leaf, the mid and lateral ribs of which are represented by the thick and hence opaque axes of the horn and its lateral processes*”.

Wood-Mason (1889: 365-368) cited again *Phyllothelys westwoodi* and *P. paradoxum*, including additional morphological diagnoses for both species and new records for the former (Cachar district, Assam; and Mergui), while he specified for the latter “*Burmah; precise locality unknown, but probably Pegu*”. He also described two new species: *P. taprobanae* from a female found in Ceylon “*collected by Mr. A.P. Green, of Colombo*” (loc. cit.: 366 and fig. 1) (fig. 3c), and *P. malayae* from a male collected in Perak, Malay Peninsula

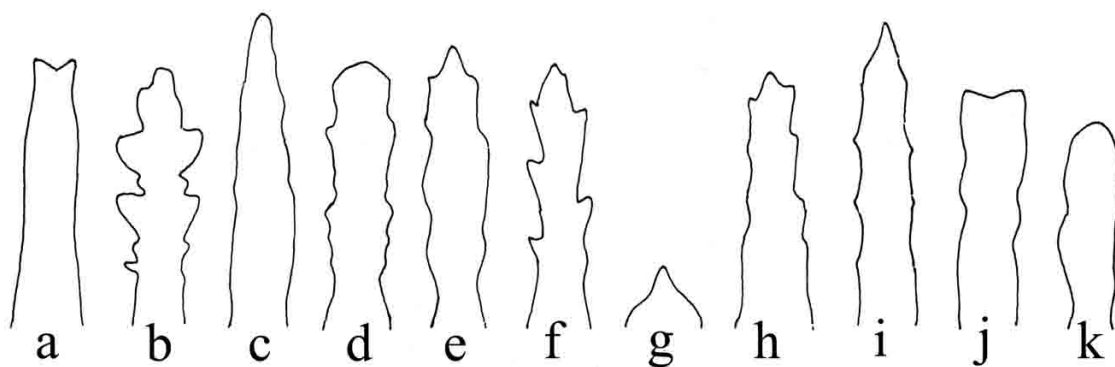


Figure 3

Processes of vertex for the types of some species of *Phyllothelys*, after the published drawings. Scales are different. **a**, ♀ *westwoodi*; **b**, juv. ♂ *paradoxum*; **c**, ♀ *taprobanae*; **d**, ♀ *sinense*; **e**, ♂ *hepaticum*; **f**, ♀ *cornutum*; **g**, ♂ *breve*; **h**, ♀ *robustum*; **i**, ♀ *cangshanense*; **j**, ♀ *parvula*; **k**, ♀ *stigmatosum*.

(loc. cit.: 367 and fig. 2) with illustrations of the head and midleg for both species (location of types not indicated, but probably ZSIC). However, from with the description and figures it is our contention that *malayae* does not belong within the genus *Phyllothelys*, but within *Ceratocrania*, a genus created the same year by Westwood (1889) from a male from Sarawak, the type species as *C. macra*. In addition, it is apparent that these two nominal species, *P. malayae* and *C. macra* are synonyms. For the stability of nomenclature, it will be most convenient to maintain the prevailing usage of *C. macra* Westwood without seeking which of the two papers was first published during the year 1889.

Westwood (1889: 22) cited *Phyllothelys Westwoodii* [sic] and *P. paradoxa*, and (loc. cit.: 44) provided a new description of the former, newly represented in black and white illustration, pl. I, fig. 3 for the male and pl. VI, fig. 6 for the female. The illustration of the female, cited from "India; Sylhet", is in conformity to that of the Wood-Mason's description. However, the illustration of the male, cited simply from India, is clearly different from Wood-Mason's treatment based on the a process of vertex exhibiting a more rounded apex (as in the Tenasserim specimen?) and a more slender pronotum. In the same paper, Westwood created his genus *Ceratocrania* with *C. macra* (loc. cit.: 46 and pl. XI, fig. 9), the male holotype (indicated as "foem.?" in the original description) in OXUM.

Brunner de Wattenwyl (1893: 73) cited "*Phyllothelys Westwoodii*" from Bhamo (Myanmar), recollecting "*Occurrit etiam in Tenasserim et Assam (Wood-Mason)*".

Dohrn (1894: 129-130, pl.V, fig. 5-6) treated *Ceratocrania macra* as *Phyllothelys macra*, rejecting the genus *Ceratocrania*. He corrected the error of Westwood concerning *macra* as for the sex of the type, and gave a description of the male and female of the species, with

colour figures.

Rehn (1903: 715-716) described with measurements, but without illustrations, the new species *Phyllothelys mitratum*, and placed it within Harpaginae, from an immature female collected from "Trong, Lower Siam" and preserved in ANSP. He stated that it is "closely allied to *P. paradoxum*, but differing in the form of the facial shield and clypeus, and the shorter head". He also specified, "frontal process almost twice the length of the remainder of head, depressed, superior surface bearing a very distinct median foliaceous longitudinal keel, lateral borders sinuate and bearing a distinct sub-basal and submedian angular lobe, lower surface with a median thickened rib".

Kirby (1904: 289) only cited "*Phyllothelys Westwoodii*" (Naga Hills, Bhutan) and "*P. Paradoxum*" (Burma), but placed them within the subfamily Creobotrinae, making reference to the previous papers of Wood-Mason and Westwood.

Werner (1909: 76) cited without any comments both *Phyllothelys* and *Ceratocrania* among other genera from "Indo-orientalische Region".

Karny (1915: 106-107) described *Phyllothelys wernerii*, placed within Creobotrinae, from a male collected from Kosempo and a female collected from Banshoryo-District, Sokutsu, in the island of "Formosa", both of which are preserved in DEI. He stated "*fastigium verticis in utroque sexu in cornu longum porrectum, carinis lateralibus et mediana valde compressis, subcristatis, superne utrinque longitudinaliter profunde sulcatum, subtus convexiusculum, in ♀ dimidio pronoti vix longius, marginibus lateralibus integris, levissime sinuatis, apicem versus dilatatum, apice ipso truncato-emarginatum, in ♂ pronoto triplo brevius, marginibus lateralibus utrinque obtuse biundatis, quare ante apicem dilatatum, apice ipso triquetro, subacuminato*". This work did not include any illustration, only measurements after the original description. In addition, the new species was only compared with *P. westwoodii* and *P. paradoxum*.

Giglio-Tos (1915: 10) placed *Phyllothelys* in his newly created subfamily Acromantinae, reported previous citations of *P. westwoodii*, *paradoxum* and *mitrata* [sic], and described without figures *Phyllothelys decipiens* from a female located in Bombay (MZUF), a male from Buitenzorg (now Bogor) in Java (MSNG), and an additional male from Patu in Borneo (SMSM). He noted "*Fulva, Ph. Westwoodi simillima sed distincta: ♀ processu verticis apice integro subacuto, ♂ processu verticis brevior, obtuse rotundato*" and gave a length for the process of 1 mm in males and 9 mm in females. As we have seen with Wood-Mason's (1877: 18) treatment of *P. westwoodii*, the sexual dimorphism

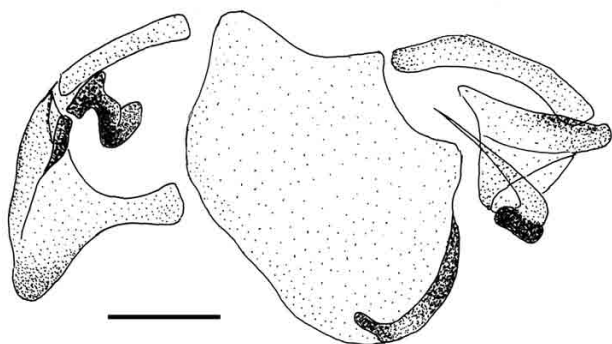


Figure 4
Male genitalia, ventral view, of a specimen (slide n° 4077, R. Roy, MNHN), from Shaanxi identified as *Phyllothelys shaanxiense* (scale bar = 1 mm).

between the described specimens and the difference of geographic localization, there is no doubt that the males and female(s) of *P. decipiens* do not belong to the same species. Therefore, it is necessary to designate a **lectotype**, which we choose as the female first described as *decipiens* (**present designation**). In addition, at this point it is not entirely evident that the two described males are conspecific.

Giglio-Tos (1919: 73) considered a group Phyllothelides in the subfamily Acromantinae, including the genera *Phyllothelys*, *Sigerpes*, and *Anasigerpes*.

Werner (1922: 156) described without figures *Phyllothelys bakeri*, placed as before within Acromantinae, from a male collected in Luzon, Laguna Province, Mount Maquiling (UPPC) that he considered “near *Phyllothelys westwoodi*”. He further specified “It is possible that this species may be identical with *P. decipiens*”. Also, he wisely noticed “Possibly the males figured by Wood-Mason and Westwood as *Phyllothelys westwoodi* belong to two different species. The horn of the vertex in the figure by Westwood is distinctly shorter, the pronotum laterally densely spinose, the anterior femora slenderer, and the lobes of the hind

legs more denticulated.”

Werner (1926: 231) again cited among Acromantinae his *Phyllothelys bakeri* from Philippines, without further comments.

Giglio-Tos (1927: 531-533) presented the same classification as was first proposed in 1919. A new and simplified diagnosis is given for *Phyllothelys*, followed by a key (in French) for the species, excluding *bakeri*, *malayae*, and *taprobanae*. The five species *westwoodi*, *decipiens*, *wernereri*, *paradoxum* and *mitratum* so newly considered are redescribed.

Werner (1931: 1333) reported a single male from “Dehra Dun” (India) as *Phyllothelys westwoodi*.

Shiraki (1932: 122) cited *Phyllothelys wernereri* from “Formosa”.

Beier (1935: 127-128) proposed the tribe Phyllotheliini to be included within the subfamily Mantinae, where he placed *Phyllothelis* [sic] and *Ceratocrania*. Six of the known species of *Phyllothelys* (except *malayae* and *taprobanae*) are cited with their geographic localizations.

Tinkham (1937: 564, pl. 17 fig. 5) cited nine males from China, which he identified as *Phyllothelys wernereri*, four from “Kwanhsien”, now Guan Xian,



Figure 5
Map of the countries where *Phyllothelys* species were recorded.

and five from “Mt Omei”, now Emei Shan, both in Sichuan Province. He provided illustrations of the head and pronotum in lateral view for one of them, which demonstrate a simple shaped process of vertex. However, he was unsure of his identification with the following comment quite justified: “*Without male and female specimens of weneri from Formosa it is impossible to decide the exact status of this species. These specimens fit the description given for weneri and for the time being I am recording that species for the first time from China. It was known formerly from Formosa only and on that island is very rare*”. We believe that there is effectively very little chance that this species is *weneri* based on the difference of localities.

Ôuchi (1938a: 23-26, pl. III) created the new genus *Kishinouyea* for his new species *K. sinensis*, described from an single female from “Tienmushan, Chekiang province”, now Tianmu Shan, Zhejiang, preserved in the IEAS. The type specimen is represented with colour illustrations of the dorsal view in true size (fig. 2), and its head twice enlarged (fig. 3d). The new genus, only classified among Mantidae, is compared with *Ceratocrania* Westwood but not with *Phyllothelys*, as it seems the author had no knowledge of this genus; However, there are no particular features of this new genus that are not suitable to those of *Phyllothelys*. Therefore, we consider herein that *Kishinouyea* is a junior synonym to *Phyllothelys*. Further, the new species fits perfectly among the other species of *Phyllothelys*, especially regarding the process of its vertex so described “*Vertical projecting forwardly as in a shape of a parallel sided plate, with a ridge on the middle line, few irregular broad marginal cleft on each lateral sides, on the upper surface. Vertical projection swells on the base. Vertical projection flat without any mark*”.

Ôuchi (1938b), later perceived that *Kishinouyea* had already been used in 1910 by Mayer for a genus of Coelenterata as a replacement name of *Schizodiscus* Kishinouye, 1902, also for homonymy. He gave to his genus the new replacement name *Kishinouyeum* on an “errata slip”, and not page 27 of the journal where is his initial article, as this was wrongly mentioned at several times.

Beier (1940: 92) reported one male and three females of *Phyllothelys weneri* from Kuatun “*in der Provinz Fukien*” (now Fujian), reminding that “*Die Art wurde erstmalig von Tinkham (1937) aus China (Szetschwan) erwähnt.*”

Roonwal and Bhasin (1951: 317) mentioned *Phyllothelys westwoodi* from “*Uttar Pradesh: Dehra Dun*” in India.

Beier (1964: 952) placed *Phyllothelis* [sic] and *Ceratocrania* in Mantidae: Phyllotheliinae; the genus

Kishinouyeum is not mentioned.

Beier (1968: 11) used the same classification as in 1964.

Petersen & Gaedike (1970: 147) cited that the syntypes ♂ and ♀ of *Phyllothelys weneri* are in DEI.

Marshall (1975: 311) stated that Kirby (1904) erroneously considered the single (♂) specimen of *Phyllothelys westwoodi* in the BMNH as type-material, and corrected that it was only a specimen seen by the author of the species and recognized as conspecific with the type-material.

Hua (1983: 12, 29, figs 13–14) cited *Kishinouyeum jiangfenglingensis* from Jiangfengling without description (*nomen nudum*), and with two rather poor dorsal and lateral photographs.

Hua (1984: 29-30, fig. without No.) placed *Kishinouyeum* among the subfamily Vatinae and described *K. jiangfenglingensis* [sic] from a single female from “Jianfengling, Hainan Island, Guangdong Province”, which is deposited in the collections of ICRI. The photograph of the dorsal view of the type is given again along with a table that compares it with *K. sinensis*. The author specifies: “*The apex of the vertical projection of the new species, Kishinouyeum jiangfenglingensis Hua, is truncate, while that of the latter round*” (not evident on the photo, which shows in compensation the very elongate metazone of pronotum).

Zhang (1988: 301-304) described a male of *K. sinensis* from Linan County, Zhejiang, with drawings of head and genitalia. In addition he described two new species, each with a single male: *K. hepaticus*, from “Chong’an Co., Fujian Province” and *K. cornutus* from “Chong’an, Fujian Province”. The head and the genitalia are illustrated for *K. hepaticus* (fig. 3e,f), while the head and the anterior part of pronotum are illustrated for *K. cornutus*. The types of the two new species are kept in NAUJ. The cephalic processes of the three figured males are long; the apex is rounded for *sinensis*, pointed for the other two; *cornutus* has the peculiarity to have acute angles on the sides of the supracoxal dilation of the pronotum.

Lombardo (1992: 380) cited a female of *Phyllothelys westwoodi* from Myanmar (“*Birmanian: Pekkong*”).

Zhou and Shen (1992: 65) cited a male of *Kishinouyeum sinensis* again from China, in the Zhejiang Province.

Wang (1993a: 51-52, fig. 55) mentioned *Phyllothelys weneri* from China after Shiraki (1932) and Tinkham (1937), a drawing of the latter being reproduced; the species was placed among Hymenopodidae: Phyllotheliinae. In the same paper, Wang (1993a: 67-70, fig. 69–78) placed the genus *Kishinouyeum* among Vatinidae: Vatinae and proposed a key (in Chinese)

for the four known species, which was illustrated by reproductions of the previously published figures. The last two described species were called *hepatica* and *cornuta*.

Wang (1993b: 4-6, fig. 1-3) described a fifth species of *Kishinouyeum*, *K. breve*, from two males from the Yunnan Province: one from "Damenglong, Xishuangbanna", the other from "Jinghong County", while the types are kept in IEAS. The head and the anterior part of the pronotum were illustrated in dorsal and lateral views, showing the very short process of pronotum and the prozone with denticulated sides (fig. 3g). The genitalia were also represented.

Mukherjee *et al.* (1995: 315-317) proposed a key (in English) for the three species of *Phyllothelys* they knew from India: *decipiens*, *werner*i and *westwoodi*, classified as Mantidae: Phyllothelinae. The two sexes were mentioned for *decipiens* with measurements and distributions matching the original description, but without comments regarding the differing features of the males mentioned above. For *werner*i, new localization for India were provided including two males from "Uttar Pradesh: Nainital: Ramnagar, Garjia Forest", but we believe that the identifications must be erroneous. For *westwoodi*, a male and a female are described from "Assam: Cachar; Schar"; the male, with its process of vertex "incised at an obtuse angle at apex" as that of the female with a length of 7 mm, therefore different than the specimens described by Wood-Mason and by Westwood for this species.

Wang & Jin (1995: 197) mentioned among others *Kishinouyeum jianfenglingensis* [sic] as an endemic species of China.

Wu & Wu (1995: 54) cited *Kishinouyeum sinensae* [sic] from Baishanzu Mountain, Eastern China (South of Zhejiang Province).

Niu & Liu (1998: 14-16, fig. 1) described *Kishinouyeum robusta* from a female collecting in the "Baotianman Nature Reserve, Neixiang County, Henan Province", and now preserved in HNU, which they included illustrations of the head and the anterior part of pronotum (fig. 3h). The process of vertex is long, angular at apex and with notched sides. A new key (in Chinese) is proposed for the six known species of *Kishinouyeum*.

Yang & Wang (1999: 86-88, fig. 8-7, et 103-104) proposed the family of Phyllotheliidae with the type genus as *Phyllothelis* [sic], listed between the Hymenopodidae and the Mantidae. They also included *Ceratocrania* and *Kishinouyeum* within this family, with *Kishinouyeum* listed as only being present in the Fujian Province with three included species: *cornutum* and *hepaticum*, formerly known and here for the first

time in grammatical concord, and *wuyiense*, newly described with four males from "Chong'an Sangang" (Fujian Province) preserved in BAUC, the genitalia of which are illustrated. This new species is "quite similar to *K. hepaticum*, but slightly smaller, and differs by the male genitalia distinctly".

Yang & Zhang (1999: 30) described *Kishinouyeum shaanxiense*, placed within the Phyllotheliidae, from a male holotype from Nanzeng, Shaanxi Province, 1500 m, and three male and two female paratypes from Shaanxi, stored in Entomological laboratory of BAUC. A colour photo and a drawing of male genitalia are provided. It is mentioned again that the genus *Kishinouyeum* is peculiarly distributed in China and contains seven species.

Hua (2000: 22) listed for China *Kishinouyeum* [sic] *cornutum* from Fujian, *K. hepaticum* from Fujian, *K. jianfenglingensis* from Hainan, *K. sinensis* from Zhejiang, and *Phyllothelys werner*i from Taiwan, Sichuan.

Mao (2001: 505-506, fig. 1-2) described *Kishinouyeum cangshanensis* from a single female collected in "Dali (25°40'N, 100°8'E), Yunnan Province". He provided illustrations for the head (fig. 3i) and the pronotum with a description that the process of vertex is 12 mm in length with a pointed apex and undulated sides. The type is deposited in DTCY.

Ehrmann (2002: 198) listed *Kishinouyeum* as including the six species *breve*, *cornuta*, *hepatica*, *jianfenglingensis*, *robusta*, and *sinensis*. Then he listed (loc. cit.: 280) *Phyllothelys* including the six species *bakeri*, *decipiens*, *mitratum*, *paradoxum*, *werner*i, and *westwoodi*. These two genera are respectively situated (loc. cit.: 378) within the Vatininae and the Phyllotheliinae in the family Mantidae.

Shen *et al.* (2002: 21) cited *Kishinouyeum robusta* and *K. shanxiensis* [sic] from the Henan Province.

Ran (2002: 119) cited *Kishinouyeum hepatica* among Vatinidae in the Maolan Nature Reserve, Guizhou Province.

Ghate & Ranade (2002: 350) cited *Phyllothelys westwoodi* from "Tadoba, Dist. Chandrapur" in India.

Xu & Mao (2004: 8-10, fig. 1-3) described *Kishinouyeum parvula* from a single female collected in "Qiaohou (99°46'E, 26°06'N), Eryuan County, Yunnan Province" and provided illustrations of the head with a process exhibiting a truncate apex (fig. 3j), of the pronotum, and of a part of the abdomen. An included table compares the new species with *K. jianfenglingensis* and *K. cangshanensis*.

Ge & Cheng (2004: 527) cited *Kishinouyeum* [sic] *shaanxiense* as a remarkable mantid from China.

Zhou & Zhou (2004: 161-163, fig. 1-2) described

Kishinouyeum stigmusosus among Vatidae with a female from Linjiang, Guizhou Province. Drawings are given for the head (fig. 3k) and pronotum, with a table to compare with *K. sinensis*.

Sureshan *et al.* (2004: 231) provided a redescription of the female of *Phyllothelys westwoodi* after a specimen “collected under light Ranidoh, Rest House, Coll. D.B. Bastawade, 26.ix.1997”, and gave the known distribution for the species: India, Assam, Uttar Pradesh, Maharashtra, and Myanmar.

Thulsi Rao *et al.* (2005: 1906, image 6, pl. iii) cited among Phyllothelinae, one male and two females of *Phyllothelys westwoodi* from Shikharam; Kumol District, which is the first report for Andhra Pradesh, India, while also recording, previous citations.

Otte & Spearman (2005: 290) mentioned *Phyllothelys* among Phyllotheliinae (where they put also *Ceratocrania macra*) with eight other species, the six enumerated by Ehrmann, and also *malayae* and *taprobanae*, which were omitted by Ehrmann and numerous other authors. They included (loc. cit.: 304) *Kishinouyeum*, with *breve*, *cornutus*, *hepaticus*, *jianfenglingensis*, *robusta* and *sinensis* among Vatinae: Danuriini, where they also placed nine other genera.

Jadhav *et al.* (2006: 2262) cited *Phyllothelys westwoodi* from Pench National Park, Maharashtra, India.

Sureshan *et al.* (2006: 231) again described a female of *Phyllothelys westwoodi*, but this time after a specimen “collected under light Panchdhara, 22.x.1997, Coll. A.S. Mahabal”. The distribution of this species is provided once again.

Vyjayandi (2007: 125–129, figs 240–246) mentioned a female of *Phyllothelys westwoodi* from India, Kerala, Attapadi, and included figures of the complete specimen, the head, the pronotum, the foreleg, and the mid and hindlegs. The three species previously recorded from India are listed on page 152.

Conclusions

Eight species were described successively in *Phyllothelys*, of which one, *malayae*, is transferred herein to *Ceratocrania*. Further, eleven species of *Phyllothelys* were described in the synonymous genus *Kishinouyeum*, always based on a limited number of specimens. Therefore, a total of 12 species were described based on single specimens, with only a few subsequent citations mentioning a few supplementary ones. In addition, correct identifications were not always determined and instances exist of males and females being originally placed with a single species but in reality are not conspecific. The gender of

Phyllothelys was always considered as neuter, while that of *Kishinouyeum*, logically neuter, was not always considered as so. Currently, with only *Phyllothelys* as a valid genus, every adjectival specific name must be treated a neuter ending.

Evaluating what sexes are known for the 18 nominal species of *Phyllothelys*, only the four species of *westwoodi*, *wernerii*, *sinense*, and *shaanxiense* are known for both sexes. Five species are known only by males (*bakeri*, *hepaticum*, *cornutum*, *breve*, and *wuyiense*), seven are known only by females (*taprobanae*, *decipiens*, *jianfenglingense*, *robustum*, *cangshanense*, *parvulum*, and *stigmusosum*), and two are known only by a single nymph specimen (*paradoxum* and *mitratum*). The few males that were initially described as *westwoodi* as well as *decipiens* provisionally remain without names, but their very short process of vertex suggests they may be allied with *breve*. Because of the initial repartition of the species in two genera, synonymies are probable, but they will not always be evident since the types of the various species are scattered in different collections, while some may be damaged or lost. However, several of these circumstances demonstrate good discriminative characters, which will be useful for a forthcoming revision.

The geographical distribution of the genus is wide, with specimens recorded from India, Sri Lanka, Bhutan, Myanmar, China, Thailand, Taiwan, the island of Luzon in the Philippines, and also the islands of Java and Borneo. We can add Laos, West Malaysia, and Siberut Island after personal examination of specimens preserved in MNHN, OXUM, and SMNK. The genus is probably present in Bangladesh, Cambodia, Vietnam and Sumatra. In China, only the South-East is relevant, with records from the provinces of Yunnan, Sichuan, Henan, Zhejiang, Guangdong, Shaanxi, Guizhou, and Fujian; but the other provinces of this region are very probably also relevant. The distribution of each species appears more or less limited in range in spite of both sexes being fully winged. Due to the very limited number of specimens known and the great diversity within the genus, it is expected that several new species await discovery.

Very little is known regarding the biology and ecology of the species of *Phyllothelys*; only that they are often found in mountainous regions, sometimes over 2000 m. We hope that this review of *Phyllothelys* will inspire future studies of the genus and eventually lead to a full revision for the group.

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