

Taxonomic notes on the genus *Polygonia* HÜBNER, 1819 from China, with description of a new subspecies from Sichuan

(Lepidoptera, Nymphalidae)

by

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Abstract: In this paper, the genus *Polygonia* HÜBNER, 1819 from the area of the Yangtse River Basin and the eastern Tibetan Plateau in China is studied. The species status of *P. extensa* (LEECH, 1892) from E. China is confirmed, and a new subspecies, *P. extensa gongga* LANG **subspec. nov.**, is described from Sichuan, SW. China.

Terminology: In this paper, for dealing with the different seasonal forms, the authors use “dry-season form/wet-season form” which is equivalent to “spring form/autumn form”, “1st generation/2nd generation”, and “summer form/hibernating form” in different literatures.

Materials in this study are deposited in the following collections in China: the Institute of Zoology, Chinese Academy of Sciences, Beijing (IZCAS), Chongqing Museum of Natural History, Chongqing (CMNH), Entomological Museum, Northwest A & F University, Shaanxi (NWUAF), Mr. DENG HELI's Private Collection, Chongqing (DHL) and Mr. LIUZ ZIHAO's Private Collection, Anhui (LZH).

Polygonia HÜBNER, 1819 is a common Holarctic nymphalid genus. Here, the authors only deal with the genus *Polygonia* HÜBNER from the Yangtse River Basin and the eastern Tibetan Plateau in China (fig. 1). Generally, three species are recognised from the above-mentioned region, they are *P. c-aureum* (LINNAEUS, 1758), *P. c-album* (LINNAEUS, 1758) and *P. gigantea* (LEECH, 1890). Among them, the very common and easily recognizable species *P. c-aureum* (L.) from E. Asia is excluded from this study. *Polygonia extensa* (LEECH) which was described from Kiukiang [Jiujiang] in E. China has been always considered as a subspecies or an other infraspecific status of *P. c-album* (L.) by many authors. Moreover, STICHEL (1909) considered *P. extensa* (LEECH) as an abrance and the dry-season form of *P. gigantea* (LEECH). Here, the authors follow the classification of MOORE (1899) and D'ABRERA (1992), and consider *P. extensa* (LEECH) as a bona species. Additionally, a local race from W. Sichuan, which is misidentified as an individual of *P. interposita* (STAUDINGER, 1881) in D'ABRERA (1992), is considered as a new subspecies of *P. extensa* (LEECH).

Checklist of the genus *Polygonia* HÜBNER, 1819 from the Yangtse River Basin and the eastern Tibetan Plateau in China:

1. *P. c-aureum c-aureum* (LINNAEUS, 1758)
2. *P. extensa extensa* (LEECH, 1892)
3. *P. extensa gongga* LANG **subspec. nov.**
4. *P. c-album c-album* (LINNAEUS, 1758)
5. *P. c-album agnicula* (MOORE, 1872)
6. *P. gigantea* (LEECH, 1890)

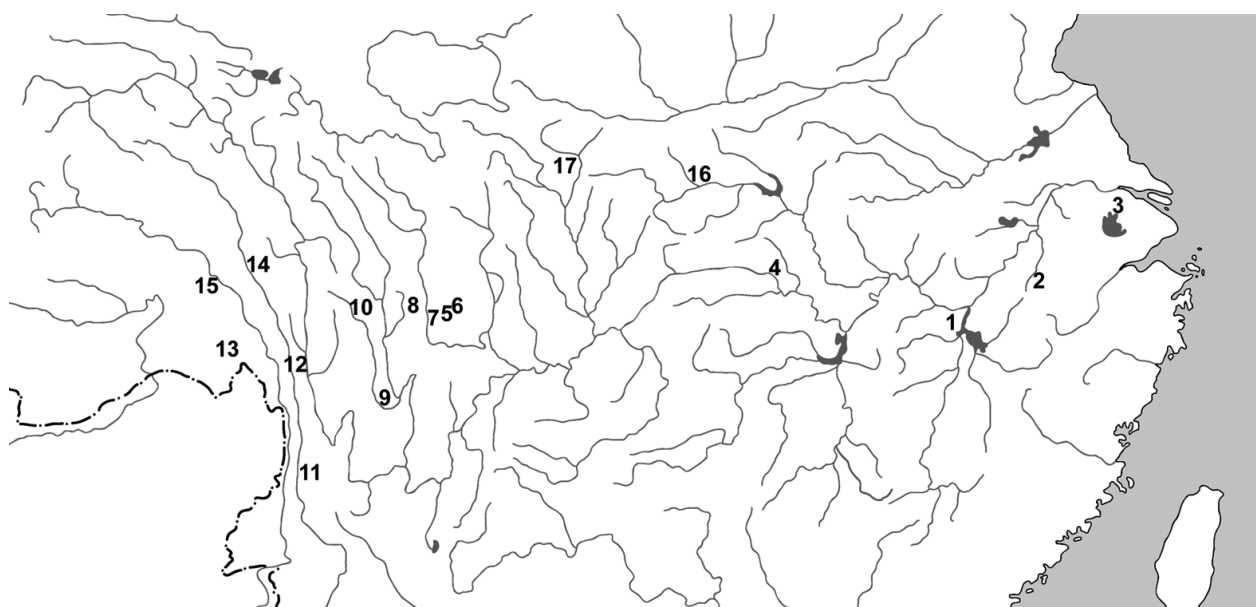


Fig. 1: Map of the Yangtse River Basin and the eastern Tibetan Plateau: - 1 = Jiujiang; 2 = Mt. Huang Shan; 3 = Wuxi; 4 = Yichang; 5 = Tianquan; 6 = Lushan; 7 = Luding; 8 = Kangding; 9 = Muli; 10 = Litang; 11 = Lanping; 12 = Deqin; 13 = Zayu; 14 = Zhagyab; 15 = Baxoi; 16 = Chenggu; 17 = Kangxian.

Taxonomy

Polygonia extensa (LEECH, 1892) (colour plate 5: 1)

Grapta c-album var. *extensa* LEECH, 1892, Butt. China 1: 265, pl. 25: 5. TL: Kiukiang [Jiujiang, Jiangxi].

Material examined: 2 ♂♂, Anhui: Mt. Huang Shan, Fuxi Village, 1.VIII.2010, coll. LIU ZIHAO (LZH); 1 ♀, Jiangsu: Wuxi, 3.IX.1951, coll. HSIA KAILING (IZCAS); 2 ♂♂, 1 ♀, Jiangxi: Kuling [Jiujiang, Mt. Lu Shan, Guling], VII.-VIII.1935 (IZCAS).

Length of forewing: ♂ 29-32.5 mm, ♀ 30-33.5 mm. Until now, only the dry-season form *P. extensa* (LEECH) has been recorded from E. China, though specimens also have been caught in August and September when the sympatric wet-season form *P. c-aureum* (L.) occurs. STICHEL (1909) believed that *P. extensa* (LEECH) is a dry-season form *P. gigantea* (LEECH), and D'ABRERA (1992) also stated: "It is possible that this taxon may represent a seasonal dimorph of *P. gigantea* LEECH". However, *P. extensa* (LEECH) can be easily distinguished from *P. gigantea* (LEECH) by the lacking of a tiny white hook on its ventral forewing. Remarkably, *P. extensa* (LEECH) is obviously larger in size than the dry-season form of those adjacent subspecies of *P. c-album* (L.), including *P. c-album c-album* (L.) from Europe, Russia and N. China, *P. c-album asakurai* NAKAHARA, 1920 from Taiwan, *P. c-album hamigera* (BUTLER, 1877) from Japan, and *P. c-album agnicula* (MOORE, 1872) from SW. China and the Himalayas. Because of its large size, the authors consider *P. extensa* (LEECH) as a distinct species against *P. c-album* (L.). However, it is unclear that whether *P. extensa* (LEECH) and *P. c-album c-album* (L.) are sympatric at the Lower Yangtse River Basin or *P. extensa* (LEECH) replaces *P. c-album c-album* (L.) at this region. Range: China (Jiangxi, Anhui, Jiangsu, Zhejiang).

Polygonia extensa gongga LANG **subspec. nov.** (colour plate 5: 5, 6)

Polygonia interposita, D'ABRERA (1992: 328), ♂♂ (Tien Tsuen [Tianquan, Sichuan]).

Holotype ♂, Sichuan: Kangding, Yulin Palace, 3400 m, 26.VII.1963, coll. ZHANG XUEZHONG (IZCAS).

Paratypes: 4 ♂♂, same data as holotype (IZCAS); 1 ♀, Sichuan: Luding, Xinxing, 1920 m, 14.VI.1983, coll. ZHANG XUEZHONG (IZCAS).

Length of forewing: ♂ 28-29 mm, ♀ 28 mm. The senior author allied those specimens collected from W. Sichuan to the species *P. extensa* (LEECH) from E. China because both of their large size. Basing upon their large geographical distance and quite different habitats, the population from W. Sichuan is considered as a distinct subspecies of *P. extensa* (LEECH). The new subspecies is only discovered in the wet-season form, whereas the typical *P. extensa extensa* (LEECH) is a dry-season form.

Diagnosis: The new subspecies can be easily distinguished from sympatric *P. c-album agnicula* (MOORE) and *P. gigantea* (LEECH) by the following characters:

1. It is obviously larger than *P. c-album agnicula* (MOORE) and smaller in size than *P. gigantea* (LEECH).
2. On the dorsal surface, hindwing discal black markings in space 2 and 3 are well developed, whereas in sympatric *P. c-album agnicula* (MOORE) the black marking in space 2 is always absent and the marking in space 3 is greatly reduced.
3. On the ventral surface, the postdiscal dots and submarginal crescent markings on both wings are turquoise green and well present, whereas in *P. c-album agnicula* (MOORE) and *P. gigantea* (LEECH) those markings are dark yellowish green or obscure.
4. On the ventral surface, FW is without a tiny white marking discally as in *P. c-album agnicula* (MOORE), whereas in *P. gigantea* (LEECH) a tiny white hook is present.

Etymology: The new subspecific name *gongga* is named after the Mt. Gongga (or called Minya Konka) which is the highest peak in Sichuan Province. All typical materials of the new subspecies were collected from this alpine area.

Remarks: D'ABRERA (1992) believed that the new subspecies, which was misidentified as a form of *P. interposita* (STAUDINGER, 1881) in his work, is very probably a race of the North American species *P. faunus* (EDWARDS, 1862).

Range: China (W. Sichuan).

Polygonia c-album c-album (LINNAEUS, 1758)

Papilio c-album LINNAEUS, 1758, Syst. Nat. (ed. 10): 477. TL: Sweden.

Material examined: 1 ♂, Shaanxi: Chenggu, 13.IX.1993, coll. WANG MIN (NWUAF); 1 ♂, Gansu: Kangxian, VI.1999, coll. ZHU XUPING (NWUAF).

Length of forewing: ♂ 24-26 mm. This subspecies is rare at the Yangtse River Basin, and it only can be easily encountered at the northern border of the Basin. It is replaced by *P. c-album agnicula* (MOORE) at the Tibetan Plateau.

Range: China (Heilongjiang, Jilin, Liaoning, Inner Mongolia, Beijing, Hebei, Shanxi, Henan, Anhui, Shaanxi, Gansu, E. Qinghai, SE. Xinjiang, N. Sichuan); Mongolia, Russia, Europe.

Polygonia c-album agnicula (MOORE, 1872) (colour plate 5: 3, 4)

Grapta agnicula MOORE, 1872, Proc. Zool. Soc. Lond. 1872: 559. TL: Katmandu, Nepal; Goolmurg, NE. of Cashmere.

Vanessa c-album var. *tibetana* ELWES, 1888, Trans. Ent. Soc. Lond. 1888: 363, pl. 10: 1. TL: Sikkim.

Material examined: 1 ♀, Sichuan: Kangding, Yulin Palace, 3400 m, 26.VII.1963, coll. ZHANG XUEZHONG (IZCAS); 1 ♀, Sichuan: Litang, Kangga, 3650 m, 3.VI.1982, coll. WANG SHUYONG (IZCAS); 1 ♀, Sichuan: Muli, Luodou, 3400 m, 28.VIII.1992, coll. LIU WEMPING (CMNH); 2 ♀♀, Sichuan: Muli, Sege, 3400 m, 11.IX.1992, coll. LIU WEMPING (CMNH); 1 ♂, Yunnan: Deqin, 3000-3500 m, 9.VIII.2006, coll. ZUO YAN (DHL); 1 ♂, Yunnan: Deqin, Mt. Baima Xueshan, 3000-3500 m, 12.VIII.2006, coll. DENG HELI (DHL); 1 ♂, Yunnan: Lanping, Yingpan, 1000-1500 m, 3.IX.2006, coll. ZUO YAN (DHL); 1 ♂, Tibet: Zhagyab, Jitang, youxi, 3600 m, 25.VII.1976, coll. ZHANG XUEZHONG (IZCAS); 1 ♀, Tibet: Baxoi, Rawu, 4250 m, 14.VIII.1973 (IZCAS); 1 ♀, Tibet: Zayu, Nanxue, 3900 m, 28.VI.1973, coll. HUANG FUSHENG (IZCAS).

Length of forewing: ♂ 24 mm, ♀ 25-27 mm. Only wet-season form specimens have been encountered in this study. The dorsal hindwing discal black marking in space 2 is absent and black marking in space 3 is greatly reduced in most of the individuals which were collected from the eastern Tibetan Plateau (E. Tibet, W. Sichuan and NW. Yunnan), whereas in individuals from central and western Himalayas, viz. the true *P. c-album agnicula* (MOORE), those black markings are always well developed. It is possible that the population of *P. c-album* (L.) from the eastern Tibetan Plateau deserves a distinct new subspecies against *P. c-album agnicula*

(MOORE).

Range: China (W. Sichuan, NW. Yunnan, Tibet); Bhutan, Sikkim, Nepal, N. India, Kashmir.

Polygonia gigantea (LEECH, 1890) (colour plate 5: 2)

Grapta gigantea LEECH, 1890, Entomologist **23**: 189. TL: Ta-chien-lu [Kangding, Sichuan].

Polygonia bocki ROTHSCHILD, 1894, Novit. Zool. **1**: 535. TL: west of Ishang [Yichang, Hubei].

Grapta gigantea ab. *erebina* OBERTHÜR, 1911, Ét. Lép. **5**: 324. TL: Tien-Tsuen [Tianquan, Sichuan].

Material examined: 1 ♂, Sichuan (IZCAS); 1 ♂, Sichuan: Lushan County, coll. WANG JINGHUA (NWUAF).

Length of forewing: 31-31.5 mm. Its ventral forewing is decorated with a tiny white hook discally, and this character is unique in this genus. Until now, only the wet-season form of this species is recorded. The taxon *bocki* ROTHSCHILD was described from W. Hubei basing upon a ♀ specimen of *P. gigantea* (LEECH) whose dorsal surface black markings are more developed than in the typical one. The specimen (colour plate 5: 2) illustrated here is similar with f. *bocki* ROTHSCHILD dorsally, but its ventral surface with ground colour more darkish than the latter as well as the typical *P. gigantea* (LEECH).

Range: China (Sichuan, W. Hubei).

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