

An Enumeration of the Flowering Plants Collected in NW Yunnan and SW Sichuan, China between 1984 and 1999—*Aconogonon*, *Bistorta* and *Koenigia* (Polygonaceae), *Rhodiola* (Crassulaceae) and *Juncus* (Juncaceae)

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Abstract The region including NW Yunnan and W Sichuan has a rich alpine flora. We have collected two species of *Aconogonon*, one of *Koenigia* and 14 of *Rhodiola* between 1984 and 1999 for studies on chromosome evolution and morphological diversity. Supplements of the previous enumeration of *Bistorta* and *Juncus* (Akiyama *et al.* 1999) are also given. A new combination, *Bistorta macrophylla* (D. Don) Soják var. *stenophylla* (Meisn.) Miyam., is proposed. Significant references and taxonomic notes are also given for each entry.

Key words: *Aconogonon*, *Bistorta*, *Koenigia*, *Rhodiola*, *Juncus*, Sino-Himalaya, alpine flora

The area from Dali to Deqin through Lijiang (Likiang), Weixi, Zhongdian (Chungtien), and around Daocheng (including [Xiao] Gongga Shan) on the border of Yunnan and Sichuan is regarded as one of the centres of species diversification in the Sino-Himalayas alpine flora. This enumeration is the result of determinations of materials collected in SW China during their field research from 1987 through 1999. *Rhodiola* was determined by Ohba and Akiyama, and *Aconogonon*, *Bistorta* and *Koenigia* (Polygonaceae), and *Juncus* (Juncaceae) by Miyamoto. In this enumeration the specimens that were collected by Iwatsuki *et al.* in 1984 in Diancangshan (Cang Shan) near Dali were also studied. All specimens are deposited in KUN and TI, and duplicates in TNS.

For members and itineraries of the field research from 1984 to 1998 see Akiya-

ma *et al.* (1998, 1999). The field research in 1999 is as follows:

1999: 30 July to 4 August	Zhongdian Xian: Hong Shan.
7 to 12 August	Zhongdian Xian: Haba Xueshan, Haba Hai.
15 August	Deqin Xian: Baima Xueshan.
16 August	Deqin Xian: Mingyong Glacier.
17 August	Deqin Xian: Baima Xueshan.
19 to 24 August	Deqin Xian: Meili Xueshan, Suola.
5 and 6 September	Dali Shi: Diancang Shan.
8 September	Lijiang Xian: Laojun Shan.
10 and 11 September	Yunlong Xian: Ziben Shan.
13 September	Lushui Xian: Pianma–Pianma Pass–Lushui.
16–19 September	Gongshan Xian: Gongshan–Dulongjiang–Gongshan.
20 September	Gongshan Xian: SW of Gongshan.
21 September	Gongshan Xian: Gongshan–Bingzhongluo–Gongshan.
24 and 25 September	Binchuan Xian: Jizu Shan, Zhunsheng Temple–Jinding Temple–Zhunsheng Temple.

Collectors: Sugong Wu, Michio Wakabayashi, Shinobu Akiyama, Yunqian Hu, Xiao Cheng, Futoshi Miyamoto and Weinyun Chen (for more details see Miyamoto 2000).

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References

- Akiyama, S., Ohba, H., Wakabayashi, M. and S.-K. Wu. 1998. An enumeration of *Saxifraga* collected in NW Yunnan and SW Sichuan, China between 1984 and 1997. *Bull. Natn. Sci. Mus., Tokyo, ser. B*, **24** (2): 61–75.
- Akiyama, S., Ikeda, H., Miyamoto, F., Noshiro, S., Ohba, H., Fang, R.-C. and S.-K. Wu. 1999. An enumeration of the flowering plants collected in NW Yunnan and SW Sichuan, China between 1984 and 1998–*Bistorta* (Polygonaceae), *Potentilla* (Rosaceae), *Saxifraga* (Saxifragaceae), *Rhododendron* (Ericaceae) and *Juncus* (Juncaceae). *Bull. Natn. Sci. Mus., Tokyo, ser. B*, **25** (4): 151–184.
- Miyamoto, F. 2000. Japan-China Botanical Research in the Hengduan Mountains, SW China in 1999. *Newsletter of Himalayan Botany*, no. 26: 8–15.

Polygonaceae

1. **Aconogonon campanulatum** (Hook. f.) H. Hara, Fl. E. Him.: 67 (1966).
var. **oblongum** (Meisn.) H. Hara in Hara *et al.*, Enum. Flow. Pl. Nep. **3**: 172 (1982).
[Specimens] Yunnan. Yunlong: Ziben Shan (Biluo Xueshan), 2800 m (Wu *et al.* 103163, 10–11 Sept. 1999).
Note: Leaves sparsely pubescent.
[Habit] On exposed places.
2. **Aconogonon tortuodum** (D. Don) H. Hara, Fl. E. Him.: 632, in adnota (1966).
[Specimens] Yunnan. Deqin: Meili Xueshan, Suola, 3900 m (Wu *et al.* 103120, 20–23 Aug. 1999).
Note: Leaves pubescent, entire; tepals glabrous.
[Habit] On exposed scree slopes.
3. **Bistorta calostachya** (Diels) Soják in Preslia, **46** (2): 152 (1974).
[Specimens] Yunnan. Lijiang: Yulongshan, 3650–4000 m (Ohba *et al.* 924, 17–26 Sept. 1987). Yangbi: Dashr Chan on the western slope of Dianchang Shan, 3100–3900 m (Kato *et al.* 316, 23 July 1988).
4. **Bistorta macrophylla** (D. Don) Soják in Preslia **46**: 152 (1974).
var. **macrophylla**
[Specimens] Yunnan. Lijiang: Yulongshan, 3650–4000 m (Ohba *et al.* 914, 17–26 Sept. 1987). Zhongdian: Hong Shan, 4200 m (Wu *et al.* 103043, 31 July–4 Aug. 1999). Sichuan. Xiangcheng: around Wuming Shan, 4700 m (Wu *et al.* 1008, 27 July 1997, TNS). Daochieng: Haizi, 4560 m (Wu *et al.* 2285, 18 Aug. 1996).
[Habit] On grassland slopes.
var. **stenophylla** (Meisn.) Miyam., comb. nov.
Polygonum stenophyllum Meisn., Monogr. Polyg. 52 (1826).
[Specimens] Yunnan. Zhongdian: Shu Du Hu, 3600 m (Wu *et al.* 1233, 23 Sept. 1994); Bi Ta Hai, 3470 m (Wu *et al.* 1011, 19 Sept. 1994, TNS).
5. **Bistorta milletii** H. Lév. in Fedde, Repert. **12**: 286 (1913).
[Specimen] Yunnan. Zhongdian: Hong Shan, 3800 m (Wu *et al.* 103047, 31 July–4 Aug. 1999).
[Habit] On edges of shrubs.
6. **Bistorta paleacea** (Wall. ex Hook. f.) Yonekura & H. Ohashi in J. Jap. Bot. **72**: 157 (1997).
[Specimens] Yunnan. Dali: Dali, 2500 m (Hara & Guan 397, 29 Aug. 1984); Huandianba, 2900–3100 m (Iwatsuki *et al.* 1225, 28 Aug. 1984); Dianchang Shan, eastern slope of Zhonghe Fong, 2550–3150 m (Kato *et al.* 230, 14 July 1988); en route from Dali town to Zhonghe temple on the eastern slope of Dianchang Shan, 2150–2650 m (Kato *et al.* 675, 15 July 1988). Lijiang: Ganhaizi, 3000–3550 m (Ohba *et al.* 175, 12 & 13 Sept. 1987). Yangbi: Zhongshan (Iwatsuki *et al.* 892, 24 Aug. 1984). Zhongdian: Hong Shan, 3800 m (Wu *et al.* 103055, 31 July–4 Aug. 1999).

[Habit] On grassland slopes.

7. ***Bistorta sinomontanum*** (Sam.) Miyam. in Bull. Natn. Sci. Mus., Tokyo, Ser. B, **25**: 153 (1999).

[Specimens] Yunnan. Lijiang: Ganhaizi, 3200 m (Ohba *et al.* 340, 12 & 13 Sept. 1987); Yunshanping, 3000–3100 m (Kato *et al.* 1838, 31 July 1988).

8. ***Bistorta vivipara*** (L.) S.F. Gray, Nat. Arr. Br. Pl. **2**: 268 (1821).

[Specimens] Yunnan. Lijiang: Yulongshan, 3650–4000 m (Ohba *et al.* 915, 17–26 Sept. 1987). Yangbi: Dashr Chan on the western slope of Dianchang Shan, 3100–3900 m (Kato *et al.* 320, 332, 23 July 1988). Zhongdian: Hong Shan, 4450 m (Wu *et al.* 103036, 31 July–4 Aug. 1999); Haba Xueshan, Haba Hai, 4500 m (Wu *et al.* 103085, 8–11 Aug. 1999)

[Habit] On grassland slopes.

9. ***Koenigia nummularifolia*** (Meisn.) Mesicek & Soják in Folia Geobot. Phyt. Praha **8**: 110, in adnota (1973).

[Specimen] Yunnan. Deqin: Meili Xueshan, Suola, 4300 m (Wu *et al.* 103114, 20–23 Aug. 1999).

Note: Stamens 5, stigmas 2.

[Habit] On scree slopes.

Crassulaceae

1. ***Rhodiola alsia*** (Fröd.) S.H. Fu in Acta Phytotax. Sin. Add. **1**: 121 (1965).

[Specimens] Yunnan. Deqin: Meili Xueshan, Suola, 4500 m (Wu *et al.* 103536, 21 Aug. 1999). Zhongdian: Haba Xueshan, Haba Hai, 4180 m (Wu *et al.* 103464, 8 Aug. 1999); Haba Xueshan, Haba Hai, 4020 m (Wu *et al.* 103480, 9 Aug. 1999); Hong Shan, 4290 m (Wu *et al.* 103402, 31 July 1999); Hong Shan, 4280 m (Wu *et al.* 103423, 1 Aug. 1999). Sichuan. Daocheng: around Gongga Shan, 4520 m (Wu *et al.* 1576, 24 Aug. 1996, TNS); around Gongga Shan, 4700 m (Wu *et al.* 1203, 5 Aug. 1997). Xiaojin: Rilong—a pass of Balang Shan—Rilong, 4250 m (Ikeda *et al.* 10110, 29 Aug. 1998).

2. ***Rhodiola bupleuroides*** (Wall. ex Hook. f. & Thomson) S.H. Fu in Acta Phytotax. Sin. Add. **1**: 124 (1965).

[Specimens] Yunnan. Deqin: Baima Xue Shan, 4170 m (Wu *et al.* 1230, 22 Sept. 1994); Baima Xueshan, 4200 m (Wu *et al.* 103507, 15 Aug. 1999); Meili Xueshan, Suola, 4450 m (Wu *et al.* 103552, 23 Aug. 1999). Lijiang: Baishui, 3000–3150 m (Iwatsuki *et al.* 1844, 4 Oct. 1987); Yulong Xueshan, Qilanbiao, 3500–3900 m (Kato *et al.* 1851, 1 Aug. 1988); Ganhaizi, 3080 m (Wu *et al.* 1456, 9 Aug. 1996, TNS); Ganhaizi, 3220 m (Wu *et al.* 635, 9 Aug. 1996); Ganhaizi, 3100 m (Wu *et al.* 643, 9 Aug. 1996). Zhongdian: Da Xue Shan, 3970–4420 m (Wu *et al.* 1125, 25 Sept. 1994); Da Xue Shan, 4120–4440 m (Wu *et al.* 1253, 26 Sept. 1994). Sichuan. Daocheng: Haizi, 4450 m (Wu *et al.* 703, 17 Aug. 1996); Haizi, 4380 m (Wu *et al.*

704, 17 Aug. 1996); Daocheng–Gongling, 3750 m (Wu *et al.* 720, 19 Aug. 1996); around Gongga Shan, 4100 m (Wu *et al.* 739, 22 Aug. 1996). Xianchang: around Wuming Shan, 4300 m (Wu *et al.* 816, 28 July 1997).

3. ***Rhodiola chrysanthemifolia*** (H. Lév.) S.H. Fu in Acta Phytotax. Sin. Add. 1: 127 (1965).

subsp. ***chrysanthemifolia***

[Specimens] Yunnan. Dali: Dianchang Shan, the eastern slope of Zhonghe Fong, 3100–3900 m (Kato *et al.* 1902, 8 Aug. 1988); Cang Shan, Zhonghe Peak, 3100–3700 m (Wu *et al.* 1423, 3 Oct. 1994, TNS); Cangshan (near Dali), 3430 m (Wu *et al.* 787, 1 Sept. 1996, TNS); Diancang Shan, Zhonghe Peak, 3450 m (Wu *et al.* 103573, 6 Sept. 1999). Lijiang: Yulongshan, 3800 m (Ohba *et al.* 910, 17–26 Sept. 1987); Yulongshan, 3800 m (Ohba *et al.* 925, 17–26 Sept. 1987). Sichuan. Daocheng: Haizi (near Daocheng), 4100 m (Wu *et al.* 700, 17 Aug. 1996, TNS).

subsp. ***sacra*** (Raym.-Hamet) H. Ohba in J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 12: 384 (1980).

[Specimens] Yunnan. Deqin: Meili Xueshan, Suola 4450 m (Wu *et al.* 103546, 23 Aug. 1999). Sichuan. Daocheng: Daocheng–Gongling, 3700 m (Wu *et al.* 723, 19 Aug. 1996); around Gongga Zhonggu, 3750 m (Wu *et al.* 834, 3 Aug. 1997). Xi-angcheng: around Da Xue Shan, 3970–4420 m (Wu *et al.* 1116, 25 Sept. 1994); around Wuming Shan, 4000 m (Wu *et al.* 821, 29 July 1997).

4. ***Rhodiola coccinea*** (Royle) Boriss. in Kom., Fl. URSS 9: 41 (1939).

[Specimens] Yunnan. Lijiang: Yulongshan, 3900 m (Ohba *et al.* 840, 17–26 Sept. 1987); Yulongshan, 3800 m (Ohba *et al.* 1058, 17–26 Sept. 1987). Zhongdian: Da Xue Shan, 3600–4200 m (Wu *et al.* 1180, 28 Sept. 1994, TNS); Daxue Shan, 4550 m (Wu *et al.* 773, 28 Aug. 1996). Sichuan. Daocheng: around Gongga Shan, 4870 m (Wu *et al.* 1573, 24 Aug. 1996, TNS); around Gongga Shan, 4700 m (Wu *et al.* 1574, 24 Aug. 1996, TNS).

5. ***Rhodiola crenulata*** (Hook. f. & Thomson) H. Ohba in J. Jap. Bot. 51: 386 (1976).

[Specimens] Yunnan. Zhongdian: Haba Xueshan, Haba Hai, 4100 m (Wu *et al.* 103483, 10 Aug. 1999); Hong Shan, 4300 m (Wu *et al.* 103411, 31 July 1999). Sichuan. Xiangcheng: around Da Xue Shan, 3970–4420 m (Wu *et al.* 1138, 25 Sept. 1994, TNS); around Da Xue Shan, 3970–4420 m (Wu *et al.* 1139, 25 Sept. 1994, TNS). Xiaojin: Ganhaizi–southwestern slope of Mt. Siguniang–Ganhaizi, 4500 (Ikeda *et al.* 100427, 1 Sept. 1998).

6. ***Rhodiola discolor*** (Franch.) S.H. Fu in Acta Phytotax. Sin. Add. 1: 124 (1965).

[Specimens] Yunnan. Zhongdian: Haba Xueshan, Haba Hai, 4050 m (Wu *et al.* 103492, 11 Aug. 1999); Hong Shan, 4190 m (Wu *et al.* 103438, 2 Aug. 1999); Tianchi, 3800 m (Wu *et al.* 670, 12 Aug. 1996).

7. ***Rhodiola dumulosa*** (Franch.) S.H. Fu in Acta Phytotax. Sin. Add. 1: 119 (1965).

[Specimens] Yunnan. Gongshan: Dulongjiang–Gongshan, 3180 m (Wu *et al.* 104213, 19 Sept. 1999). Sichuan. Daocheng: Haizi, 4200 m (Wu *et al.* 705, 17 Aug. 1996, TNS).

8. ***Rhodiola himalensis*** (D. Don) S.H. Fu in *Acta Phytotax. Sin. Add.* **1**: 121 (1965).

[Specimen] Sichuan. Xiangcheng–Daocheng, 4410 m (Wu *et al.* 685, 15 Aug. 1996).

9. ***Rhodiola kirilowii*** (Regel) Regel ex Maxim., *Prim. Fl. Amur*: 472 (1859).

[Specimens] Yunnan. Zhongdian: Haba Xueshan, Haba Hai, 4100 m (Wu *et al.* 103482, 10 Aug. 1999). Sichuan. Xiaojin: Ganhaizi–Dashuiba–Ganhaizi, 3520 m (Ikeda *et al.* 100414, 31 Aug. 1998); Ganhaizi–southwestern slope of Mt. Siguniang–Ganhaizi, 4280 m (Ikeda *et al.* 100426, 1 Sept. 1998).

10. ***Rhodiola macrocarpa*** (Praeger) S.H. Fu in *Acta Phytotax. Sin. Add.* **1**: 125 (1965).

[Specimens] Yunnan. Zhongdian: Napa Hai, 3600 m (Wu *et al.* 868, 14 Aug. 1996); Xiaoxue Shan, 4000 m (Wu *et al.* 682, 14 Aug. 1996, TNS); Xiaoxue Shan–Daxue Shan, 3830 m (Wu *et al.* 868, 14 Aug. 1996, TNS). Sichuan. Xiaojin: Rilong—a pass of Balang Shan–Rilong, 3160–4400 m (Ikeda *et al.* 10112, 29 Aug. 1998); Ganhaizi–Dashuiba–Ganhaizi, 3500 m (Ikeda *et al.* 100411, 31 Aug. 1998); Ganhaizi–Dashuiba–Ganhaizi, 3470 m (Ikeda *et al.* 100412, 31 Aug. 1998).

11. ***Rhodiola nobilis*** (Franch.) S.H. Fu in *Acta Phytotax. Sin. Add.* **1**: 120 (1965).

subsp. ***nobilis***

[Specimens] Yunnan. Lijiang: Yulongshan, 3800 m (Ohba *et al.* 898, 17–26 Sept. 1987); Yulongshan, 3900 m (Ohba *et al.* 922, 17–26 Sept. 1987). Yangbi: Dashi Chan, on the western slope of Dianchang Shan, 3100–3900 m (Kato *et al.* 346, 23 July 1988). Zhongdian–Deqin: Zhongdian–Deqin, 3970–4420 m (Wu *et al.* 1033, 20 Sept. 1994, TNS). Zhongdian: Da Xue Shan, 3970–4420 m (Wu *et al.* 1134, 25 Sept. 1994, TNS); Da Xue Shan, 3970–4420 m (Wu *et al.* 1135, 25 Sept. 1994, 1135); Da Xue Shan, 4120–4440 m (Wu *et al.* 1150b, 26 Sept. 1994, TNS); Da Xue Shan, 4240 m (Wu *et al.* 761, 27 Aug. 1996, TNS). Sichuan. Daocheng: Bowa Shan, 4460 m (Wu *et al.* 697, 16 Aug. 1996, TNS); Daocheng–Gongling, 4050 m (Wu *et al.* 900, 19 Aug. 1996, TNS); around Gongga Shan, 3920–4580 m (Wu *et al.* 2309, 22 Aug. 1996); around Gongga Shan, 4780 m (Wu *et al.* 1558, 23 Aug. 1996, TNS); around Gongga Shan, 4780 m (Wu *et al.* 1557, 23 Aug. 1996, TNS); around Gongga Shan, 4520 m (Wu *et al.* 1575, 24 Aug. 1996, TNS); around Gongga Shan, 4460 m (Wu *et al.* 845, 4 Aug. 1997); around Gongga Zhonggu, 3900 m (Wu *et al.* 833, 3 Aug. 1997); Haizi, 4000 m (Wu *et al.* 699, 17 Aug. 1996). Xiangcheng: around Wuming Shan, 4600 m (Wu *et al.* 1011, 27 July 1997); around Wuming Shan, 4220 m (Wu *et al.* 812, 28 July 1997).

subsp. ***atuntsuensis*** (Praeger) H. Ohba in *J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot.* **13**: 165 (1982).

[Specimens] Yunnan. Deqin: Meili Xueshan, Suola 4650 m (Wu *et al.* 103528, 20 Aug. 1999); Meili Xueshan, Suola 4500 m (Wu *et al.* 103537, 21 Aug. 1999). Sichuan. Daocheng: around Gongga Shan, 4630 m (Wu *et al.* 737, 22 Aug. 1996); around Gongga Shan, 4780 m (Wu *et al.* 1556, 23 Aug. 1996, TNS); around Gongga Shan, 4600 m (Wu *et al.* 1154, 4 Aug. 1997); around Gongga Shan, 4600 m (Wu *et al.* 1156, 4 Aug. 1997). Xiangcheng: around Wuming Shan, 4600 m (Wu *et al.* 1012, 23 Aug. 1996); around Wuming Shan, 4520 m (Wu *et al.* 813, 28 July 1997). Xiaojin: a pass of Balang Shan, 4350 m (Ikeda *et al.* 10439, 6 Sept. 1998).

12. ***Rhodiola primuloides*** (Franch.) S.H. Fu in *Acta Phytotax. Sin. Add.* 1: 118 (1965).

[Specimens] Yunnan. Lijiang: Yulongshan, 3900 m (Ohba *et al.* 857, 17–26 Sept. 1987); Yulongshan, 3750 m (Ohba *et al.* 890, 17–26 Sept. 1987); Yulongshan, 3800 m (Ohba *et al.* 909, 17–26 Sept. 1987); Baishui, 3000–3150 m (Iwatsuki *et al.* 1185, 4 Oct. 1987); Laojun: Longqun Lodge–Jiushijiu Longtan, 3900 m (Wu *et al.* 103577, 8 Sept. 1999).

13. ***Rhodiola pupureovirides*** (Praeger) S.H. Fu in *Acta Phytotax. Sin. Add.* 1: 125 (1965).

[Specimens] Yunnan. Lijiang: Yulongshan, 3700 m (Ohba *et al.* 839, 17–26 Sept. 1987); Yulongshan, 3950 m (Ohba *et al.* 877, 17–26 Sept. 1987); Yulongshan, 3950 m (Ohba *et al.* 878, 17–26 Sept. 1987); Yulongshan, 3950 m (Ohba *et al.* 879, 17–26 Sept. 1987); Yulongshan, 3750 m (Ohba *et al.* 901, 17–26 Sept. 1987); Yulongshan, 3700 m (Ohba *et al.* 1021, 17–26 Sept. 1987); Yulongshan, 3800 m (Ohba *et al.* 1039, 17–26 Sept. 1987); Yulong Xueshan, Qilanbiao, 3500–3900 m (Kato *et al.* 1856, 1 Aug. 1988). Zhongdian: Da Xue Shan, 3600–4200 m (Wu *et al.* 1192, 28 Sept. 1994); Haba Xueshan, Haba Hai, 4020 m (Wu *et al.* 103481, 9 Aug. 1999); Tianchi, 3600–3700 m (Wu *et al.* 1408, 30 Sept. 1994). Sichuan. Daocheng: around Gongga Shan, 3960 m (Wu *et al.* 725, 21 Aug. 1996); around Gongga Shan, 4100 m (Wu *et al.* 738, 22 Aug. 1996); around Gongga Shan, 3970 m (Wu *et al.* 842, 3 Aug. 1997); Haizi, 4100 m (Wu *et al.* 701, 17 Aug. 1996); Haizi, 4360 m (Wu *et al.* 710, 17 Aug. 1996).

14. ***Rhodiola yunnanensis*** (Franch.) S.H. Fu in *Acta Phytotax. Sin. Add.* 1: 126 (1965).

 subsp. ***yunnanensis***

[Specimens] Yunnan. Dali: Dianchan Shan, eastern slope of Zhonghe Fong, 2550–3150 m (Kato *et al.* 52, 14 July 1988); Dianchang Shan, eastern slope of Zhonghe Fong, 2550–3150 m (Kato *et al.* 224, 14 July 1988); Cangshan (near Dali), 3430 m (Wu *et al.* 792, 1 Sept. 1996, TNS); Diancang Shan Zhonghe Temple–Ximatang, 2800 m (Wu *et al.* 103568, 5 Sept. 1999). Lijiang: Baishui, 3000–3150 m (Iwatsuki *et al.* 1816, 2 Oct. 1987); Yulongshan, 3650 m (Ohba *et al.* 895, 17–26 Sept. 1987); Yunshan Ping, 3200 m (Wu *et al.* 649, 10 Aug. 1996) Yangbi: around Cangshan, 3600 m (Wu *et al.* 862, 17 Aug. 1997); Dashr Chan on the western slope

of Dianchang Shan, 3100–3900 m (Kato *et al.* 347, 23 July 1988); Dashr Chan on the western slope of Dianchang Shan, 3100–3900 m (Kato *et al.* 348, 23 July 1988). Sichuan. Xiaojin: Rilong–Ganhaizi, 3150 m (Ikeda *et al.* 100404, 30 Aug. 1998); Ganhaizi–Dashuiba–Ganhaizi, 3500 (Ikeda *et al.* 100413, 31 Aug. 1998).

subsp. **forrestii** (Raym.-Hamet) H. Ohba in J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. **13**: 126 (1982).

[Specimens] Yunnan. Lijiang: Ganhaizi, 3000–3500 m (Ohba *et al.* 805, 12–13 Aug. 1987); Ganhaizi, 3150–3500 m (Shimizu *et al.* 1864, 2 Aug. 1988); Yulongshan, 3650–4000 m (Ohba *et al.* 847, 17–26 Sept. 1987); Yulongshan, 3700 m (Ohba *et al.* 1013, 17–26 Sept. 1987).

Juncaceae

1. **Juncus allioides** Franch. in Nouv. Arch. Mus. Hist. Nat. Paris sér. 2, **10**: 99 (1887).

[Specimens] Yunnan. Lijiang: Laojun Shan, Longqun Lodge–Jiushijiu Longtan, 4000 m (Wu *et al.* 103159, 8 Sept. 1999); Lijiang–Ganhaizi, 2750–2800 m (Ohba *et al.* 380, 15 Sept. 1987, TNS). Zhongdian: Hong Shan, 4160 m (Wu *et al.* 103042, 31 July–4 Aug. 1999). Sichuan. Xiangcheng: around Wuming Shan, 4600 m (Wu *et al.* 1038, 28 July 1997).

[Habit] On marsh places in meadow.

2. **Juncus amplifolius** A. Camus in Lecomte, Not. Syst. **1** (10): 281 (1910).

[Specimens] Yunnan. Dali: Diancang Shan, Zhonghe Peak, 3200 m (Wu *et al.* 103143, 6 Sept. 1999). Lushui: Pianma–Pianma Pass–Lushui, 3200 m (Wu *et al.* 103171, 13 Sept. 1999).

[Habit] On exposed places.

3. **Juncus benghalensis** Kunth, Enum Pl. **3**: 360 (1840).

[Specimens] Yunnan. Dali: Diancang Shan, Zhonghe Peak, 3800 m (Wu *et al.* 103148, 6 Sept. 1999). Gongshan: SW of Gongshan, 2600 m (Wu *et al.* 103190, 20 Sept. 1999); SW of Gongshan, 2600 m (Wu *et al.* 103192, 20 Sept. 1999). Zhongdian: Haba Xueshan, Haba Hai, 4400 m (Wu *et al.* 103081, 8–11 Aug. 1999); Hong Shan, 4300 m (Wu *et al.* 103028, 31 July–4 Aug. 1999). Sichuan. Daocheng: around Gongga Shan, 4600 m (Wu *et al.* 1142, 4 Aug. 1997).

[Habit] On mossy rocks or banks.

4. **Juncus biglumoides** H. Hara in J. Jap. Bot. **49**: 201 (1974).

[Specimen] Yunnan. Zhongdian: Hong Shan, 4250 m (Wu *et al.* 103044, 31 July–4 Aug. 1999).

[Notes] This species is first record in China.

[Habit] On exposed places.

5. **Juncus biluoshanensis** K.F. Wu in Acta Phytotax. Sin. **32**: 463 (1994).

[Specimen] Yunnan. Lushui: Pianma–Pianma Pass–Lushui, 2600 m (Wu *et al.*

103174, 13 Sept. 1999); Pianma–Pianma Pass–Lushui, 2600 m (Wu *et al.* 103179, 13 Sept. 1999).

[Habit] On exposed places.

6. ***Juncus brachistigma*** Sam. in Hand.-Mazz., Symb. Sin. 7: 1236 (1936).

[Specimens] Yunnan. Zhongdian: Haba Xueshan, Haba Hai, 4000 m (Wu *et al.* 103087, 11 Aug. 1999); Hong Shan, 3700 m (Wu *et al.* 103027, 31 July–4 Aug. 1999).

[Habit] On mossy rocks.

7. ***Juncus clarkei*** Buchenau in Bot. Jahrb. Syst. 6: 210 (1885).

[Specimens] Yunnan. Dali: Diancang Shan, Zhonghe Temple–Ximatang, 3400 m (Wu *et al.* 103134, 5 Sept. 1999); Diancang Shan, Zhonghe Peak, 3500 m (Wu *et al.* 103146, 6 Sept. 1999). Gongshan: Dulongjiang–Gongshan, 3000 m (Wu *et al.* 103187, 18 & 19 Sept. 1999); SW of Gongshan, Gaoligong Shan, 2615 m (Wu *et al.* 103189, 20 Sept. 1999). Lijiang: Laojun Shan, Longqun Lodge–Jiushijiu Longtan, 3900 m (Wu *et al.* 103160, 8 Sept. 1999). Lushui: Pianma–Pianma Pass–Lushui, 3000 m (Wu *et al.* 103169, 13 Sept. 1999).

[Habit] On mossy rocks or banks.

8. ***Juncus concinnus*** D. Don, Prodr. Fl. Nepal.: 44 (1825).

[Specimens] Yunnan. Binchuan: Jizu Shan, Jinding Temple, 2600 m (Wu *et al.* 103197, 25 Sept. 1999). Dali: Huandianba, 2900–3100 m (Iwatsuki *et al.* 1482, 29 Aug. 1984); Diancang Shan, Zhonghe Temple–Ximatang, 3200 m (Wu *et al.* 103135, 5 Sept. 1999). Lijiang: Longpan, 1950–2250 m (Ohba *et al.* 142, 10 Sept. 1987); Baishui, 3000–3150 m (Iwatsuki *et al.* 1161, 2 Oct. 1987, TNS). Laojun Shan, Longqun Lodge–Jiushijiu Longtan, 3900 m (Wu *et al.* 103161, 8 Sept. 1999). Lushui: Pianma–Pianma Pass–Lushui, 3000 m (Wu *et al.* 103170, 13 Sept. 1999). Yangbi: Sanchaho on the western slope of Dianchang Shan, 2350–2600 m (Kato *et al.* 303, 21 July 1988); Zhongshan, 2400 m (Iwatsuki *et al.* 232, 23 Aug. 1984); Zhongshan, 2500 m (Iwatsuki *et al.* 480, 23 Aug. 1984). Yunlong: Ziben Shan, 2700 m (Wu *et al.* 103164, 10 & 11 Sept. 1999).

[Habit] On banks or rocks.

9. ***Juncus crassistylus*** A. Camus in Lecomte, Not. Syst. 1 (10): 278 (1910).

[Specimens] Yunnan. Dali: Diancang Shan, Zhonghe Temple–Ximatang, 3200 m (Wu *et al.* 103138, 5 Sept. 1999); Diancang Shan, Zhonghe Peak, 3700 m (Wu *et al.* 103153, 6 Sept. 1999); Diancang Shan, Zhonghe Peak., 3300 m (Wu *et al.* 103144, 6 Sept. 1999). Lushui: Pianma–Pianma Pass–Lushui, 3200 m (Wu *et al.* 103173, 13 Sept. 1999).

[Habit] On exposed banks or edges of shrubs.

10. ***Juncus dongchuanensis*** K.F. Wu in Acta Phytotax. Sin. 32: 457 (1994).

[Specimens] Yunnan. Binchuan: Jizu Shan, Jinding Temple–Zhusheng Temple, 2900 m (Wu *et al.* 103198, 25 Sept. 1999). Dali: Diancang Shan, Zhonghe Temple, 3200 m (Wu *et al.* 103136, 5 Sept.); Diancang Shan, Zhonghe Peak, 3300 m (Wu *et*

al. 103151, 6 Sept. 1999).

[Habit] On banks.

11. ***Juncus effusus*** L., Sp. Pl.: 326 (1753).

[Specimens] Yunnan. Dali: Diancang Shan, Zhonghe Temple–Ximatang, 2900 m (Wu *et al.* 103129, 5 Sept. 1999). Lushui: Pianma–Pianma Pass–Lushui, 2600 m (Wu *et al.* 103176, 103178, 13 Sept. 1999).

[Habit] On marsh places.

12. ***Juncus fimbristyloides*** Noltie in Edinb. J. Bot. **55**: 39, f. 1B, 2E–J (1998).

[Specimens] Yunnan. Binchuan: Jizu Shan, Jinding Temple–Zhusheng Temple, 2900 m (Wu *et al.* 103196, 25 Sept. 1999).

[Notes] This collection is the second record in China.

[Habit] On mossy rocks.

13. ***Juncus gracilicaulis*** A. Camus in Lecomte, Not. Syst. **1** (10): 279 (1910).

[Specimens] Yunnan. Deqin: Meili Xueshan, Suola, 3700 m (Wu *et al.* 193125, 20–23 Aug. 1999). Lijiang: Laojun Shan, Longqun Lodge–Jiushijiu Longtan, 3700 m (Wu *et al.* 193162, 8 Sept. 1999).

[Habit] On mossy rocks.

14. ***Juncus harae*** Miyam. & H. Ohba in J. Jap. Bot. **68**: 27, f. 1 (1993).

[Specimen] Yunnan. Zhongdian: Haba Xueshan, Haba Hai, 4100 m (Wu *et al.* 103082, 8–11 Aug. 1999).

[Notes] This is the first record from China.

[Habit] On mossy rocks.

15. ***Juncus himalensis*** Klotzsch in Klotzsch & Garcke, Bot. Reise Pr. Waldemar: 60, t. 97 (1862).

[Specimen] Yunnan. Lijiang: Laojun Shan, Longqun Lodge–Jiushijiu Longtan, 3700 m (Wu *et al.* 103157, 8 Sept. 1999).

[Habit] On exposed scree slopes.

16. ***Juncus khasiensis*** Buchenau in Bot. Jahrb. Syst. **12**: 407 (1890).

[Specimens] Yunnan. Dali: Diancang Shan, Zhonghe Temple–Ximatang, 3300 m (Wu *et al.* 103140, 5 Sept. 1999). Gongshan: Dulongjiang–Gongshan, 3000 m (Wu *et al.* 103185, 18 & 19 Sept. 1999).

[Habit] On mossy rocks.

17. ***Juncus kingii*** Rendle in J. Bot. **44**: 45 (1906).

[Specimen] Sichuan. Daocheng: Bowa Shan (Wu *et al.* 2250, 16 Aug. 1996).

18. ***Juncus leptospermus*** Buchenau in Bot. Jahrb. Syst. **6**: 203 (1885).

[Specimen] Yunnan. Dali: Diancang Shan, Zhonghe Temple–Ximatang, 2600 m (Wu *et al.* 103130, 5 Sept. 1999).

[Habit] On marsh places.

19. ***Juncus longiflorus*** (A. Camus) Noltie in Edinb. J. Bot. **51**: 134 (1994).

[Specimens] Yunnan. Dali: Diancang Shan, Zhonghe Peak, 3600 m (Wu *et al.* 103145, 6 Sept. 1999); Diancang Shan, Zhonghe Peak, 3700 m (Wu *et al.* 103147, 6

Sept. 1999). Yangbi: Dashr Chan on the western slope of Dianchang Shan, 3100–3900 m (Kato *et al.* 330, 23 July 1988); Dashr Chan on the western slope of Dianchang Shan, 3100–3900 m (Kato *et al.* 338, 23 July 1988).

[Habit] On exposed places.

20. **Juncus milashanensis** A.M. Lu & Z.Y. Zhang in *Acta Phytotax. Sin.* **17**: 127 (1979).

[Specimen] Yunnan. Deqin: Meili Xueshan, Suola, 4600 m (Wu *et al.* 103115, 20–23 Aug. 1999).

[Habit] On scree slopes.

21. **Juncus minimus** Buchenau in *Bot. Zeit.* **25**: 145 (1867).

[Specimens] Yunnan. Deqin: Meili Xueshan, Suola, 4500 m (Wu *et al.* 103112, 20–23 Aug. 1999). Zhongdian: Hong Shan, 4600 m (Wu *et al.* 103031, 31 July–4 Aug. 1999).

[Habit] On grassland slopes.

22. **Juncus ochraceus** Buchenau in *Abh. Naturwiss. Vereine Bremen* **3**: 292 (1873).

[Specimens] Yunnan. Gongshan: Dulongjiang, 1700 m (Wu *et al.* 103180, 17 Sept. 1999); SW of Gongshan, Gaoligong Shan, 2500 m (Wu *et al.* 103191, 20 Sept. 1999). Lushui: Pianma–Pianma Pass–Lushui, 2600 m (Wu *et al.* 103175, 13 Sept. 1999). Yunlong: Ziben Shan, 2700 m (Wu *et al.* 103165, 10 & 11 Sept. 1999).

[Habit] On exposed places.

23. **Juncus perpusillus** Sam. in *Hand.-Mazz., Symb. Sin.* **7**: 1237 (1936).

[Specimen] Yunnan. Zhongdian: Hong Shan, 4600 m (Wu *et al.* 103030, 31 July–4 Aug. 1999).

[Habit] On grassland slopes.

24. **Juncus prismatocarpus** R. Br., *Prodr.*: 259 (1810).

[Specimen] Yunnan. Lushui: Pianma–Pianma Pass–Lushui, 2515 m (Wu *et al.* 103177, 13 Sept. 1999).

[Habit] On marsh places.

25. **Juncus przewalskii** Buchenau in *Bot. Jahrb. Syst.* **12**: 401 (1890).

[Specimens] Yunnan. Deqin: Meili Xueshan, Suola, 4500 m (Wu *et al.* 103113, 20–23 Aug. 1999). Zhongdian: Hong Shan, 4360 m (Wu *et al.* 103029, 31 July–4 Aug. 1999); Hong Shan, 4600 m (Wu *et al.* 103032, 31 July–4 Aug. 1999).

[Habit] On scree slopes.

26. **Juncus sherei** Miyam. & H. Ohba in *J. Jap. Bot.* **72**: 293, f. 1 (1997).

[Specimens] Yunnan. Gongshan: SW of Gongshan, Gaoligong Shan, 2600 m (Wu *et al.* 103193, 20 Sept. 1999). Zhongdian: Haba Xueshan, Haba Hai, 4500 m (Wu *et al.* 103080, 8–11 Aug. 1999).

[Habit] On mossy rocks.

27. **Juncus setchuensis** Buchenau in *Bot. Jahrb. Syst.* **29**: 238 (1896).

[Specimen] Yunnan. Gongshan: SW of Gongshan, Gaoligong Shan, 2615 m (Wu

et al. 103188, 20 Sept. 1999).
[Habit] On marsh places.