

Hideaki OHBA* & K. R. RAJBHANDARI** : **Three species of
Rhodiola (Crassulaceae) new to Nepal*****

大場秀章*・K. R. ラジバンダリ** : ネパールで新たに見出された
イワベンケイ属3種***

Recently we noticed some *Rhodiola* new to Nepal. Among them we here treat three entities of the subgenus *Rhodiola* sect. *Rhodiola*.

1) ***Rhodiola lobulata*** (Singh et Bhattacharyya) H. Ohba, stat. nov.

[Fig. 1 & 2a-f]

R. imbricata Edgew. var. *lobulata* Singh et Bhattacharyya in Bull. Bot. Surv. Ind. 25: 246 (1985).

Specimens examined. India. Himachal Pradesh: Sach Pass, alt. 4535 m (N.C. Nair 32763, CAL—Holotype). Nepal. [Seti Zone (West Nepal)]: Bajang-Surmasarowa [ca 81°10'E 29°40'N], alt. 4400 m, on the alpine grassland, on rock (M. S. Bista & D. P. Josi 583, KATH, TI).

This plant was recently described by Singh & Bhattacharyya (1985) from Sach Pass in the Karakoram Range, Himachal Pradesh (Kashmir). Though they regarded this as a variety of *Rhodiola imbricata* Edgew., this is different enough to distinguish from that as a distinct species. Because this has narrowly elliptic or angular-oblancoate leaves with remotely and roughly crenulate margins as against oblanceolate or narrowly elliptic ones with margins entire or nearly so. The flowers are also different from those of *R. imbricata* in being larger in all parts. Singh & Bhattacharyya described this based on the male plant and gave no information of the female flower. It may be emended by the female material collected in Nepal as follows:

Leaves (Fig. 2f) narrowly elliptic-angular-oblancoate with remotely crenulate margins, 2-4 cm long, 0.8-1.5 cm wide, acute at the apex, glabrous. Female flowers (Fig. 2a) 5-merous. Calyx 5-6 mm long, thick herbaceous, the

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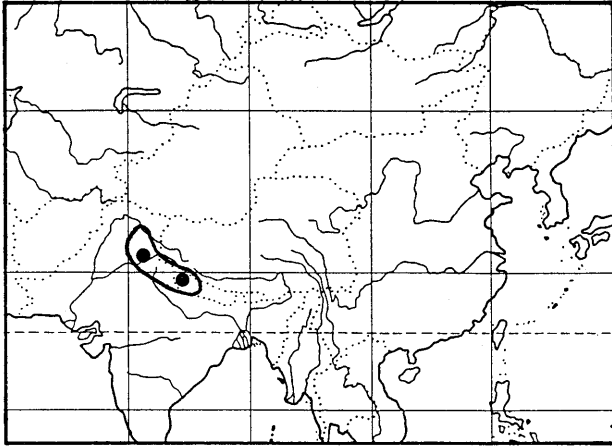


Fig. 1. Distribution of *Rhodiola lobulata*.

tube 1.5–2 mm long, the lobes (d) subulate, 3.8–4 mm long, 0.9–1.1 mm wide at the base, obtuse at the apex, suberect, flattish. Petals (e) free, suberect, narrowly oblong-linear, 4–5 mm long, 1–1.2 mm wide, obtuse at the apex, slightly concave inside. Nectar-scales (b) broadly oblong with round or truncate apex, appressed to the ovary, 0.7–1.2 mm long, 0.6–0.8 mm wide. Gynoecium (c) basally connated with the calyx tube; the free part erect, 4.5–7 mm long, tapering, the style indistinct, stigma papillate, the placenta marginal. Ovules 20–22 in each locule, ellipsoidal, ca 2 mm long.

From the distribution, we suspect that this still remains unknown from botanists in the region from Kashmir and Kumaun eastward to W Nepal (Fig. 1).

2) ***Rhodiola purpureoviridis* (Praeger) Fu subsp. *phariensis* (H. Ohba) H. Ohba, stat. nov.** [Fig. 2g–h, 3 & 4]

Sedum phariense H. Ohba in Journ. Jap. Bot. 48: 328 (1973).

Rhodiola phariensis (H. Ohba) Fu in Bull. Bot. Lab. N E Forest. Inst. No. 6, 75 (1980); in Fl. Reip. Pop. Sin. 34(1): 218 (1984); in C. Y. Wu, Fl. Xizan. 2: 427 (1985).

S. bupleuroides (non Hook. f. et Thoms.): H. Ohba in Ohashi, Fl. E Himal., 3rd rep. 320 (1975), pro min. parte, incl. Pl. 3c.

R. bupleuroides (non Fu): H. Ohba in Journ. Fac. Sci. Univ. Tokyo, Sect. III, 13: 83 (1981), pro min. parte, excl. typo.

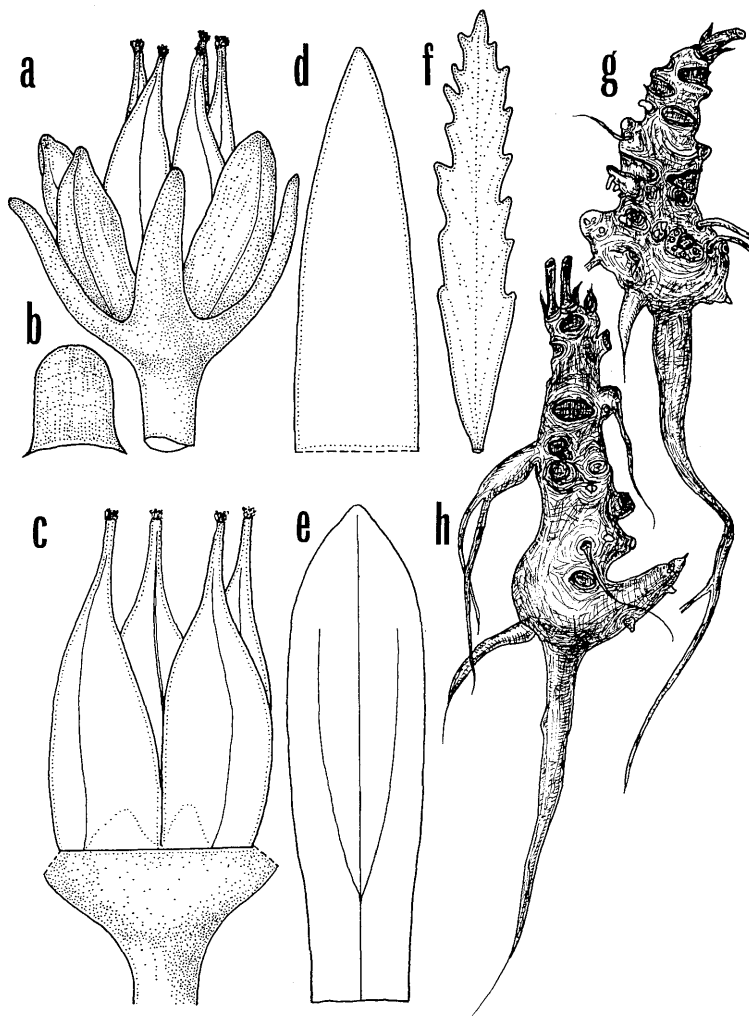


Fig. 2. *Rhodiola lobulata* (a-f) and *R. purpureoviridis* subsp. *phariensis* (g, h). a. female flower, \times ca 7.5. b. nectar-scale, \times 15. c. gynoecium, \times ca 7.5. d. calyx-lobe, \times 15. e. petal, \times 15. f. leaf, \times ca 1/2. g & h. rhizomes, \times ca 1.

Description added. MALE FLOWERS: Calyx-lobes ascending, green. Petals green with deep purplish red stripes (so that they look like greenish red), spreading widely at anthesis. Stamens erect, filaments red purplish, anthers

before dehiscence greenish red. Nectar-scales blackish purple, lustrous. Ovaries green tinged with red. FEMALE FLOWERS: Calyx-lobes green, suberect. Petals green beneath, green with deep purplish red stripes above, suberect to ascending. Nectar-scales blackish purple, lustrous. Ovaries green but later tinged with red.

Specimens examined. Xizan (Tibet). Chumbi: prope Phari (Dungboo s. n., CAL 159421—Holotype); prope Kang Loo (King's coll. s. n., CAL). Nepal. Janakpur Zone (Central Nepal): Rukthang-Kalingchok-Kuri, alt. 3400 m (Kanai, T.B. Shresta & S. Adhikari 674624, KATH, TI). Bagmati Zone (C. Nepal), Gosainkund Area: Gotiora-Gadje, alt. 3300 m, on rock (Kanai & Malla 674783, KATH, TI); Gosainkund, alt. 4000 m (Kanai, Hara & Ohba 726363, TI); Surjakund-



Fig. 3. *Rhodiola purpureoviridis* subsp. *phariensis* (Central Nepal, Gandaki Zone, Manangbhot Dist., Thanti-Manang, alt. 4000 m. On 29 July, 1983).

Gopte, alt. 3650 m, on exposed rocky banks (Kanai, Hara & Ohba 726365, τ_1); Gopte-Thale Patil, alt. 3200 m (Kanai, Hara & Ohba 726366, τ_1). Chilime Valley: Yatumbal-Kharka, alt. 3100 m, on rock (Kanai & Shakya 672146, $\kappa\alpha\tau\eta$, τ_1). Gandaki Zone (C. Nepal), Manangbhot Dist.: Phedi-Thanti, alt. 4080-4400 m (Ohba, Kanai, Wakabayashi, Suzuki & Akiyama 8330867, 8350701, τ_1); Thanti-Tenki-Manang, alt. 4000 m (O.K. W.S. & A. 8330921, τ_1); Tilicho Base Camp-Khangsar, alt. 4000 m (O.K. W.S. & A. 8331044, τ_1).

The senior author (Ohba) described this subspecies as *Sedum phariense* based on the several specimens from Chumbi Valley in the southernmost Tibet. He once sank this in *Rhodiola bupleuroides*, which was, at that time, considered to show an extremely wide range of variations, particularly in the shape and size of leaves and the size of flowering stems (Ohba 1981). In our field survey in Gandaki Zone, Nepal, we notice that this apparently different from *R. bupleuroides* (Wall. ex Hook. f. et Thoms.) Fu by having green petals with red purplish stripes and irregularly rugged, thick, erect rhizomes (Fig. 2g-h; 3). The typical form of *R. bupleuroides* has deep purplish red petals and cylindrical creeping rhizomes. At present, it is much better to be interpreted that the type of *S. phariense* is the smallest representative of this subspecies.

In *Rhodiola* a considerable number of species are disjunctively distributed

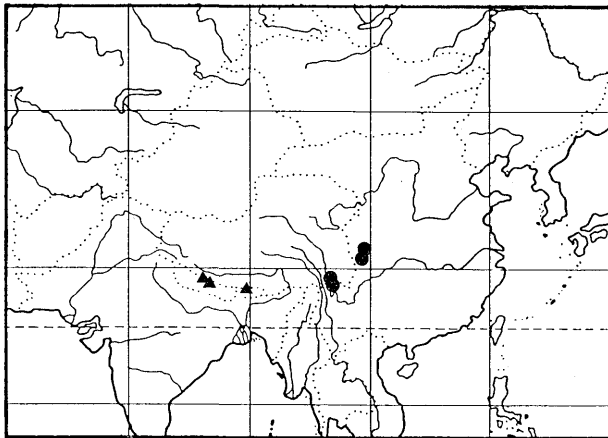


Fig. 4. Distribution of *Rhodiola purpureoviridis* subsp. *purpureoviridis* (●) and subsp. *phariensis* (▲).

in both eastern Himalaya and S W China (Yunnan and Szechuan) and, a few species among them are differentiated locally to be distinguished as infraspecific taxa such as subsp. *Cretinii* of the Himalayas (Nepal, Sikkim, S. Tibet & Assam) and subsp. *sino-alpina* of S W China (Yunnan) in *R. Cretinii* (Ohba 1981). *R. purpureoviridis* is also regarded as one of the these case (Fig. 4). Subsp. *purpureoviridis*, known from S W China and well illustrated by Praeger (1921), differs from this (subsp. *phariensis*) by taller and densely papillate flowering stems with somewhat broader leaves.

At Marsyandi Khola area in Gandaki Zone, this is not so rare and grows among the dwarf *Rhododendron lepidotum*-bush with *Potentilla fruticosa* (var. *rigida*) on flattish dry river-beds or gentle slopes.

3) ***Rhodiola pamiroalaica*** A. Boriss. in Fl. URSS 9: 40, 477 (1939); Engl. trans. 33, 363 (1971). [Fig. 5]

Sedum pamiroalaicum (A. Boriss.) Jansson in Jansson & Rechinger, f., Fl. Iran. 72, 7 (1970), pro parte.

Specimens examined. India. Kashmir: Karakoram Range, Hisper Glacier (Tokyo Univ. Exped. in 1966, 11). Nepal. Seti Zone (W. Nepal): Bajhang Dist., between Saipal and Aletsoura, alt. 4090 m, on unstable alpine scree adjacent to grassland (Tabata, Rajbhandari & Tsuchiya 1753, 11, 12).

The present knowledge of *Rhodiola* flora of West Nepal is still imperfect. This *Rhodiola* is distributed in both Pamir-Alai region and West Mongolia, Kuldja and Kashgar (Sinkiang-Uigur). It is also reported from Afghanistan, Chitral (Hindu Kush) by Jansson & Rechinger, though some specimens referred to this by Jansson are regarded as *R. imbricata*. At present, its distribution range appears to extend from there eastwards farther to the Nepal-Himalayas (Fig. 5) through the Karakoram Range.

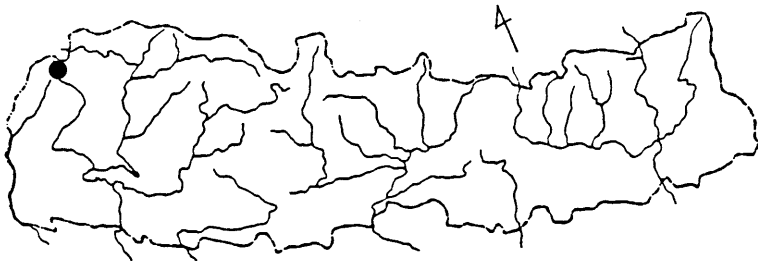


Fig. 5. Locality of *Rhodiola pamiroalaica* in Nepal.

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著者のひとり大場は1981年にイワベンケイ属の再検討を行なったが、本稿はその後東京大学のネパール植物調査でこの属について得た新たな知見をまとめたものである。

1) *Rhodiola lobulata* はカンミールの Sach 峠で採集された雄個体にもとづいて最近記載されたものである。西ネパールではその雌個体が採集されていて、本文に雌花の特徴を記載した。独立種とすべきものである。

2) *Rhodiola purpureoviridis* subsp. *phariensis* はチベット・チュンピ谷からの採集品によって記載されたが、これまでその正体が正確にはつかまれていなかった。その原因はこの亜種の標本が少なく、変異がよく判らなかつたことにもあるが、近縁と考えられる *R. bupleuroides* の変異の実体がつかめなかつたことにもよる。1983年に中部ネパールのマルシェンディ谷沿いのマナン付近で生品を観察することができ、*R. bupleuroides* との違いを明らかにすることができた。すなわち、*R. purpureoviridis* subsp. *phariensis* は、多少凹凸のある直立の肥厚する根茎と緑色で多数の紅紫色の縞が入る花卉を有する。それにたいして、*R. bupleuroides* は、円筒状で細長い横走する根茎と一緒に濃紅紫色の花弁をもつ。ヒマラヤ産イワベンケイ属全種のうち約半数(9種)は中国西南部(雲南・四川)にも分布する。それらの中の数種は、本種のように両地域間で多少とも異なる変異を示している。

3) *Rhodiola pamiroalaica* は西モンゴル、新疆・ウイグル、パミール、アライからアフガニスタン、パキスタン(ヒンズクシー地方)に分布することが知られていたものである。この種については類縁関係をはじめまだ不明の点が多く、資料の蓄積を待ってさらに検討が必要である。