

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

Other proposals

A. PROPOSAL : Appendix II

B. PROPONENT: CITES Authority, Ministry of Environment & Forests,

India.

C. SUPPORTING STATEMENT :

1. TAXONOMY : - - -

1.1. Class : Dicotyledoneae

1.2. Order : Personales

1.3. Family : Scrophulariaceae

1.4. Scientific name : *Picrorhiza kurrooa* Royle ex

Benth. Scroph. Ind. 47.1835.

1.5. Scientific synonyms : Nil.

1.6. Common names:

Beng. : Katki, Kutki, Kuru

Bomb. : Kutaki

Dec. : Kali-Kutki

Guj. : Kadu

Hindi : Katki, Kutki, Kuru

Kashmir: Kour

Kumaon : Karru, Kaur

Mal. : Kaduqurohini, Katukaroqani

Mar. : Kutaki

Nepal : Kuruwa

Punjabi: Karru

Sans. : Katuka, Katuruhini

Tam. & Tel.: Kaduqurohini, Katukaroqani

Arab. & Pers.: Kharbaque-hindi

1.7. Code number: Not known.

2. BIOLOGICAL PARAMETER:

2.1 Population status: Rare. The species is a native of India. The previous records established its population spreaded over a wide range in alpine Himalayas from Kashmir to Nepal & Sikkim and further extended to the mountains of Yunnan in China with natural re-generation through seeds and rootstocks. The population had been very common as recorded and authenticated by workers like Watt, Stewart, Royle, etc., from the late nineteenth century to the seventies or eighties of the present century. The rhizomes or the rootstocks had been in use for various ailments and diseases by the local ethnic groups and also in indigenous medicines since centuries back, but that caused little damage to the wild population. It is only with the advancement of biotechnology, the exploitation increaes manyfold resulting a quick decline in its natural source. A recent survey reveals that the species has been totally wiped out from many previously recorded localities at

comparatively lower altitudes, whereas once recorded dense population in higher altitudes have been shrunk and dissected. But in the protected areas like "Valley of Flowers National Park" they are found in concentrated patches with more than 50 individuals within an area of one square metre.

2.2. Population trend: Vulnerable. The destruction of population in the wild is more than 60% as a whole due to indiscriminate collection of the rhizomes even before the setting of fruits, and thereby causing hindrance to the natural regeneration of the species. The repeated field survey suggests, if such uninterrupted and unplanned uprooting continues, the species will move to an irreversible threat category in near future.

2.3. Distribution: Himalayas, from Jammu & Kashmir to Nepal, Sikkim and further extended to the mountains of Yunnan in China.

2.4. Habitat availability: The species grow in well drained, moist, undisturbed rocky slopes of alpine Himalayas at altitudes between 3000 and 5000 m.

2.5. Geographic trend: As far as the present report and study concern, the species is not extending beyond its previous distribution as noted in item 2.3.

2.6. Threat: The over collection for its valuable rootstocks/rhizomes used for the treatment of a wide range of diseases is the greatest threat to the species. Because of its high demand both in national and international market, sometimes they are indiscriminately collected and hoard beyond the capacity of utilization and necessity. During a recent survey huge bunches of uprooted plants in donkey loads were found being carried to the market, which had been collected from the wild sources. The other factor for its decline is the habitat disturbance, commonly faced by many rhizomatous or bulbous potential species in the Himalayan region. Construction of various developmental projects like dams and/or industry, etc. caused mass destruction of many such potential genetic resources, whereas the indirect and long term effect passed through habitat destruction, changing of ecosystem and pollution, etc. Construction of roadways also gave momentum and

one time destruction due to easy access to the potential resources which have been flourished in inaccessible terrain over the years.

3. UTILIZATION AND TRADE:

3.1. National utilization: The rootstocks of the

species are used by various ethnic groups in the hills since time immemorial for various ailments and diseases. This is also an important component for various Ayurvedic and yunnani medicines. Moreover, with the advancement of biotechnology, increased belief on herbal medicines and development of pharmaceutical industry, its demand enhanced manifold and to meet the high demand large quantities of plants are collected from wild and marketed. The rhizomes are also used as an adulterant of, or as a substitute for the Indian gentian, the *Gentiana kurroo*. In Sikkim only as much as about 4000 kg of rootstocks have been marketed during 1993-94.

3.2. Legal international trade: A recent analysis of

trade records reveals that large quantities of *Picrorhiza kurrooa* rootstocks are regularly exported from India to Sri Lanka, U.S.A. and

Australia. According to Wildlife Protection, Western Zone, Pune, about 7218 kg in 1992-93, 1000 kg in 1993-94 and 2060 kg in 1994-95 have been exported through Bombay Port, whereas through the Calcutta Port about 4000 kg. in 1991-92, 9000 kg in 1994-95 and 300 kg in 1995-96 have been exported as revealed from the records of Wildlife Protection, Eastern Zone, Calcutta. But the real exploitation is much more than what the present records envisage, and this is strengthened by an expert report from IUCN saying 10-24 tonnes of *Picrorhiza kurroos* roots are exported from the range countries, where obviously the maximum quantity is from India.

3.3. Illegal trade: Considering its high demand which is mostly export-oriented, a large quantity is supposed to be covered by illegal trade both as smuggle form or in disguise of another species taking advantage of similarity in appearance.

3.4. Actual and potential trade impact: In Sanskrit literature the rootstocks are described as

bitter, acrid and stomachic. The extract is considered to be a valuable tonic and almost as efficacious as the Indian gentian *Gentiana kurroo* Royle. The drug extracted from the rootstocks contains large proportion of bitter principles namely Picrorrhizin, Kutkin, Kurrin, Kuticol and Kutki-sterol. The sesquiterpene is reported to be the odorus principle of the root. They are largely used as stomachic, antipyretic, antiperiodic, antihelminthic, laxative, emetic in small doses and cathartic in larger doses. They are also prescribed in bilious fever, dyspepsia, urinary trouble, asthma, burns, leucoderma, jaundice, liver complaints, epilepsy, gouts, ringworm infection, scabies and piles. The roots are also valued as an ingredient of various purgative combinations. To meet such a multifarious medicinal use nationally and internationally, the population is at a greater risk because the supply is almost cent percent from the wild resources at present.

3.5. Captive breeding or artificial propagation

(outside country of origin): Not known.

4. CONSERVATION AND MANAGEMENT :

4.1. Legal status:

4.1.1. National: After study of population the species has been treated under the "Vulnerable" category in "Red Data Book of Indian Plants" by Botanical Survey of India.

4.1.2. International: Considering the intensity of threat, the species should be included in Appendix II of CITES immediately for effective regulation of trade..pa

4.2. Species management:

4.2.1. Population monitoring: Being undertaken by the scientists of Botanical Survey of India.

4.2.2. Habitat conservation: Some of its original habitat fall under the Nanda Devi Biosphere Reserve and Valley of Flowers National Park in U.P. Himalayas where they are automatically protected. Appropriate conservation strategies are being made to conserve the species in Sikkim Himalayas also.

4.2.3. Management measures: Programmes are on to

reintroduce the species in some of its original habitats faced severe degradation due to over-exploitation and/or other environmental factors. Environmental Impact Assessment are carried out by the Botanical Survey of India and other such scientific organisation in certain proposed developmental sites, and appropriate strategies are being planned for its protection and conservation before the project takes shape. Attempts are being made for its cultivation and multiplication by seeds and rhizomes for commercial exploitation through rotational harvest and quota system.

4.3. Control measures :

4.3.1. International trade: As the species faced highest threat in the wild due to over exploitation in national and international trade, the regulation of trade through inclusion in Appendix II of

CITES seems to be the most effective measure at present to protect it from irreversible damage. The rhizomes/root stocks which are easily identifiable are proposed for inclusion in Appendix II only, but not the derivatives.

4.3.2. Domestic measure: Appropriate strategies are being made to protect and conserve the species *in situ*. Programmes have been taken for its artificial propagation and cultivation through seeds and rhizomes as the species is a potential source of wide range of herbal medicine and the economy of the local people is directly linked with it. More attention is being given also for its sustainable harvest to serve the dual purpose of protection and utilization.

5. INFORMATION ON SIMILAR SPECIES :

5.1. Similarity in appearance: The rhizomes and

rootstocks of *Gentiana kurroo* Royle also superficially look like those of *Picrorhiza kurrooa* Royle ex Benth. Medicinal properties

and drug values are also more or less same and hence the common trade and vernacular name "Kutki" is applied to both the species concerned. Because of this fact, *Picrorhiza kurroa* roots serve as the common adulterant to Indian gentian (*Gentiana kurroo*). However, *Picrorhiza kurroa* rootstocks/rhizomes can be easily distinguished by associated withered leaf bases, thicker skin, comparatively more wrinkled and transversely striated surface and prominent radiating rays in cross section. They are evanescent or hollow inside and hence easily compressed. The roots of *Gentiana kurroo* in contrast are devoid of any withered leaf bases, thinner skin, comparatively smooth surface without any radiating rays in cross section. The rhizomes are hard and hence do not easily compressed. Moreover, the leaves of *Picrorhiza kurroa* are oblanceolate, while in *Gentiana kurroo*, they are mostly linear lanceolate. *Neopicrorhiza scrophulariflora* (Pennell) D. Y. Hong (*Picrorhiza scrophulariflora* Pennell) is another allied species restricted to Sikkim Himalayas and is rare which can be distinguished by irregular

flower on scape like peduncle without bract and included stamens.

5.2. Nature of specimen in trade: Both light brown to deep yellowish or black rhizomes/rootstocks are in trade. They are as thick as the little finger or so when dry (0.5-1.0 cm), cylindric, remain covered with withered leaf bases. They may be marketed intact, 3-6 cm long, or in small pieces.

5.3. Appendix listing: None so far.

6. OTHER COMMENTS :

6.1. Range states: Nepal, China.

6.2 Intergovernmental organisation: CITES Management

Authority of India in correspondence with the Management authority of China and Nepal. During the last Plant Committee meeting the ~~Management~~ ^{Scientific} Authority of India had a discussion with the Management Authority of China and ~~Nepal~~ regarding the proposal of inclusion in Appendix II of CITES and they principally agreed to it. However, the matter is under correspondence.

7. ADDITIONAL REMARKS:

Description: Small, more or less hairy perennial herbs.

Rootstocks elongate, stout, as thick as a little finger, covered with withered leaf bases. Leaves oblanceolate, 5-10 cm long, sharply serrate. Scape (inflorescence stalk) stout, longer than subtending leaves, many flowered, bracts oblong or lanceolate. Flowers white or pale blue purple. Capsules (fruits) ovoid, 1-1.5 cm long, turgid.

Annotation : The diagnostic morphological and anatomical (cross section) characters of rhizomes/rootstocks (parts in trade) of both *Picrorhiza kurroa* and *Gentiana kurroo* are appended here along with drawing for easy identification.

Picrorhiza kurroa

Gentiana kurroo

MORPHOLOGICAL

1. Rhizomes/rootstocks remain usually associated with withered leaf bases.

1. Devoid of withered leaf bases.

2. Elongate, usually as thick as the little finger or so and

2. More slender but stout, not hollow inside and

hollow or evanescent inside.	hence not easily
hence easily compressed.	compressed.
3. Skin thinner or membranous, more wrinkled and prominently striated.	3. Skin thicker, more or less smooth.

CROSS SECTION

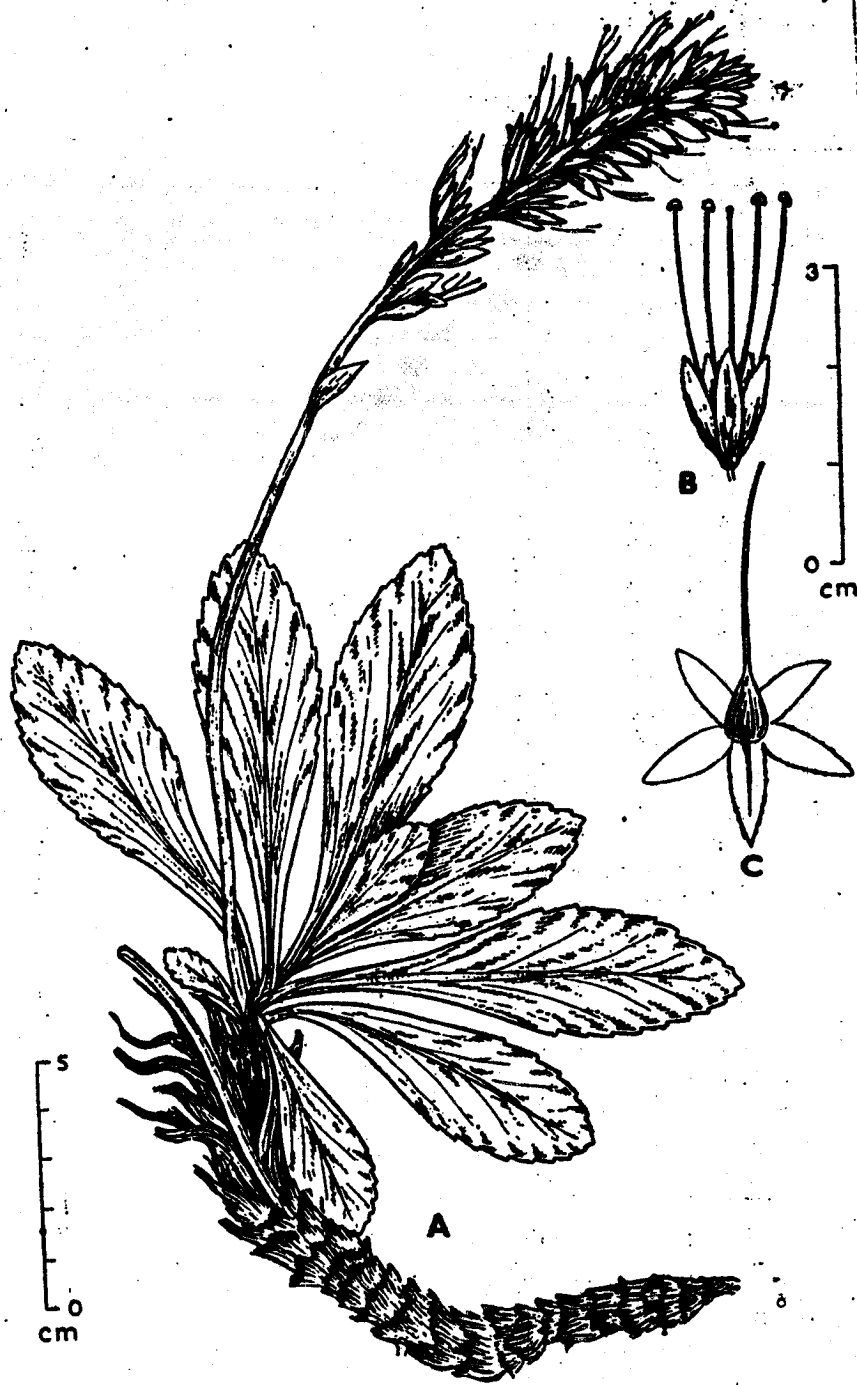
1. Bundles (Xylem & Phloem) are arranged towards the corticular (towards the periphery) region.	1. Bundles are arranged at the central region.
2. Pericycle (a ring like structure) surrounding the bundles is very prominent.	2. Pericycle not prominent
3. Presence of prominent pith.	3. Pith not prominent.

The CITES control should be limited to the roots and
readily recognisable parts thereof (derivatives
may not be included).

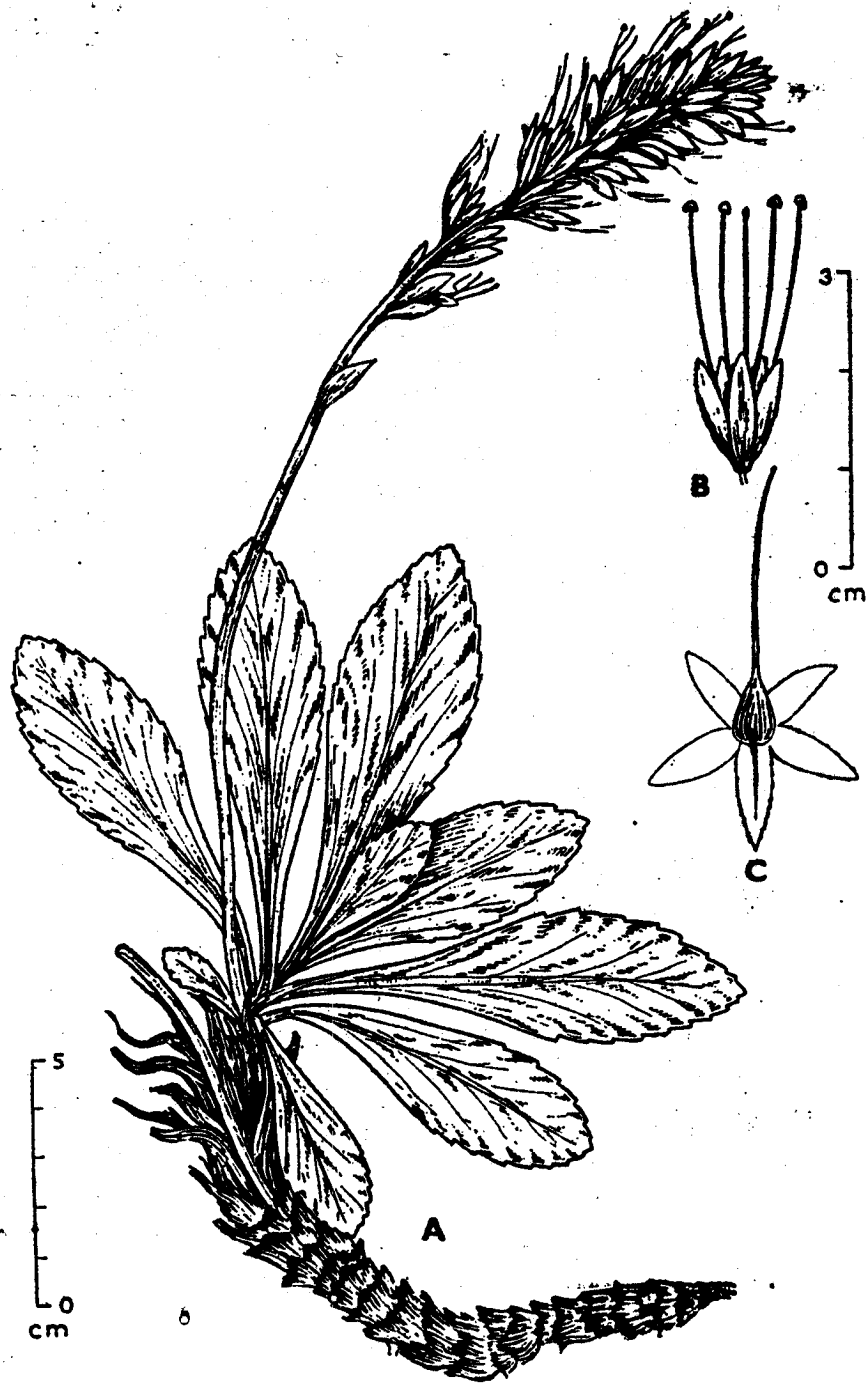
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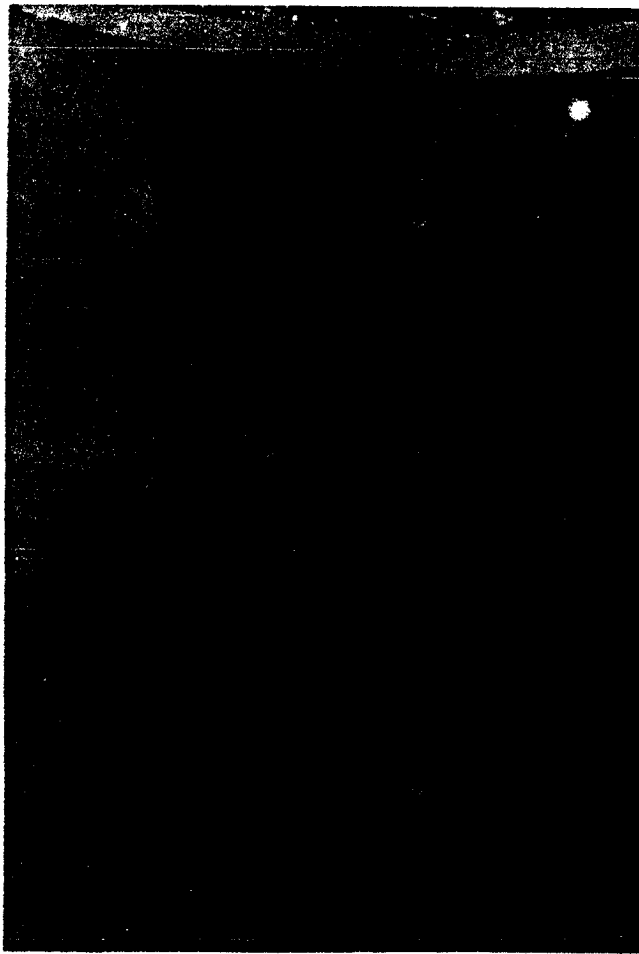
Picrorhiza kurroa Benth. A. Habit. B. Flower. C. Pistil. (after Royle).



Picrorhiza kurroa Benth. A. Habit. B. Flower. C. Pistil. (after Royle).



PART OF RHIZOME FOR EXPORT



Picrorhiza kurroa Royle ex Benth.

STATUS: Vulnerable and becoming scarce due to over-exploitation for its medicinal properties.

DISTRIBUTION: Himalayas: Jammu and Kashmir to Sikkim.

HABITAT AND ECOLOGY: Fleshy rooted perennial on rocky alpine slopes at 3300-5000 m altitude.

CONSERVATION MEASURES TAKEN: None.

CONSERVATION MEASURES PROPOSED: Collection of this species from the wild should be banned. Attempts should be made to cultivate this important medicinal plant for its exploitation.

BIOLOGY AND POTENTIAL VALUE: Fls. and Frts: June-September. Perennial herb with elongate, stout creeping rootstock, propagated by seeds and rhizomes. Widely used as a medicine in a large number of diseases and ailments.

CULTIVATION: Not known in cultivation.

DESCRIPTION: Rootstock as thick as little finger, covered with withered leaf-bases. Leaves 5-10 cm, coriaceous, tip rounded, base narrowed into a winged sheathing petiole. Scape stout, ascending, longer than the leaves, with or without bracts below the inflorescence. Spike 5-10 cm long, obtuse, many flowered, sub-hirsute; bracts oblong or lanceolate, as long as calyx. Sepals 5, lanceolate, 4-7 mm long, ciliate. Corolla 5-8 mm long; lobes ovate, acuminate, ciliate. Capsule 1-1.5 cm long, ovoid, turgid, acute.

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The material for this sheet was supplied by H. J. Chowdhery, Botanical Survey of India, Dehra Dun.