

In search of *Sanjeevani*

K. N. Ganeshiah*, R. Vasudeva and R. Uma Shaanker

This article reports our attempt to explore the possible plants that could represent Sanjeevani – the mythical herb from the epic Ramayana. Our search was based on a set of criteria developed from the consistent details available from the epic on the names of the herb in different languages, its habitat, medicinal values and the ability to ‘resurrect’ life. Accordingly, from an initial list of potential candidate species, we have filtered two species on which initial studies can be focused. However, our search is not complete and hence not final, as there could be other approaches and accordingly, other suggestions as well for Sanjeevani.

Keywords: *Desmotrichum, Ramayana, resurrection, Sanjeevani, Selaginella.*

SANJEEVANI is among the most mysterious and most sought-after herbs in Indian mythology, whose existence and identity are steeped in deep controversy. While the miracle associated with this herb is due to its alleged potentiality for ‘resurrecting’ life, the controversy about its existence and identity is because of the difficulties in arriving at a specific candidate plant (species) that could pass as *Sanjeevani*. Despite its evasiveness, the herb has been a subject of serious discussions for over centuries. Of late, there is a renewed interest in searching for its identity owing to the emerging realization that biological resources are the untapped capital of any country¹. Obviously there have been repeated attempts to associate certain plants with this term, but not without ambiguity².

In this article, we present the results of our ‘search’ based on certain criteria developed for filtering possible candidate species for *Sanjeevani*. Using these criteria that reflect the possible habitat, expected medicinal properties and potential resurrecting ability, we have attempted to home on to a couple of species that could be considered for further investigation on *Sanjeevani*.

Does *Sanjeevani* exist?

Whether or not *Sanjeevani* exists needs to be examined irrespective of whether or not the *Ramayana* is a fact of history or figment of imagination³. For several reasons: first, *Sanjeevani* as a concept is deep rooted in the traditional system of Indian medicine. Secondly, as a herb that can resurrect life, *Sanjeevani* figures in other mythological stories as well^{4,5}, such as the story of ‘Yayathi’ and thus seems to have a broad cultural base. Thirdly, given

its high potential value, it is worth probing lest we miss out a potentially important biological resource. For these reasons, we propose that the process of evaluating the existence of *Sanjeevani* shall follow a logical process of elimination of the following alternate possibilities.

1. It refers to a specific plant, either extinct or extant, with a strong potential for resurrecting life.
2. It is merely a conceptual term referring to a specific group of plants with a potential for invigorating the dying health.
3. It is a metaphoric term for any plant(s) with a good medicinal value.
4. It is simply an imaginary plant that never existed.

Obviously, only after the first three possibilities could be objectively rejected, can we conclude that *Sanjeevani* is merely an imaginary plant. In fact, the spirit of science shall be to capture on these possibilities, however meagre they could be, than to wrongly assume that all things unknown to science do not stand a chance. Therefore, in the true spirit of science, it is important to develop certain objective criteria through which we can filter the possible candidates for *Sanjeevani*.

Criteria for searching *Sanjeevani*

As the epic *Ramayana* has been retold and rewritten several times in several languages, it is not surprising that there are various versions of it and accordingly, the details on *Sanjeevani* also vary. Nevertheless, certain basic details are retained consistently in most of the versions and from these it should be possible to derive a few criteria to search for *Sanjeevani*. Accordingly, following the kidnapping of Sita by the demon King Ravana, allegedly to the present Sri Lanka⁶, Rama crossed the ocean and waged a war against Ravana to rescue his wife. Support-

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ing him were Hanuman⁷ and his associates with their strong army (of monkeys). During the war, Lakshmana, Rama's brother, was hit by an arrow⁸ and was seriously injured. In fact, he entered into an unconscious state – interpreted as a state of death! Bringing him back to 'life', or to the conscious state required him to be treated with a particular herb, *Sanjeevani* (literally meaning something that offers life; jeeva = life) known to be available in India and hence Hanuman was summoned to India to fetch this plant. Accordingly, Hanuman landed on a mountain range⁹ (occasionally called *Sanjeevani Parvatha*), but could not locate and/or identify the exact plant. He therefore decided to gather a large mass of all plants that were similar to the intended herb and carried this mass of plants to Sri Lanka¹⁰. Of course, the collection he carried contained the exact plant *Sanjeevani* and hence Lakshmana could be treated; and he got back to the action in the war immediately! From these details of the epic it should be possible to develop a set of criteria for searching the candidate herb as mentioned below.

1. The plant must have been referred to in different languages in India with terms akin to/close to *Sanjeevani*.
2. It should be a plant occurring at high altitude.
3. It should be a very effective medicinal plant.
4. It should be capable of 'resurrecting' life.

These criteria are arranged in increasing order of stringency and this sequence is particularly important to be followed because if we begin with the most stringent criteria, we may miss out several possible candidates. For instance, if we begin with the last criterion, owing to the lack of sufficient knowledge on the ability of plants to 'resurrect' life, we are likely to miss out several potential candidates. Therefore, we have preferred to follow the above sequence that begins with a large size of the filter and proceeds towards a very fine-scale filter for screening the potential candidate plants.

Sanjeevani in Indian languages

The *Ramayana* and other mythical stories/*puranas* that refer to *Sanjeevani* have remained a part of the cultural heritage for several millennia in the Indian sub-continent and in certain neighbouring countries such as Thailand, Indonesia and Cambodia. Hence they have been a part of the oral tradition, told and retold in diverse tongues spread across the country. Therefore, the name of this herb should have percolated into diverse languages, even in altered forms. These names are also likely to be associated with certain herbs and in this sense reference to *Sanjeevani* or to its altered form in different languages could be considered as the fossil evidence that indicates the possible candidates for the herb.

In our laboratory, we have been building a database on the Indian bioresources and as a part of this, we have a

library of the common names of most Indian plants, in about 80 different languages and dialects^{11–13}. From this database, we searched for the term *Sanjeevani* and its synonyms (words with similar meaning) or phononyms (words sounding phonetically similar) in Sanskrit in particular and in other languages as well. Accordingly, a preliminary list of about 17 species was arrived at from which, on further examination, six groups of plants, viz. *Cressa cretica*, *Selaginella bryopteris*, *Desmotrichum fimbriatum*, *Malaxis acuminata* (*M. wallichii*, *Microstylis wallichii*), *Trichopus zeylanicus* and *Terminalia chebula* were shortlisted, as these were consistently and repeatedly referred to by words akin to *Sanjeevani* (Table 1).

However, among these, the common names of the last three groups were only indirectly indicative of the term. In other words, for the last three sets of species, the use of the term *Sanjeevani* is not very obvious. Whereas for the first three species, there is frequent and consistent reference of the term and or its nearest phononym. Therefore, the first three species, viz. *C. cretica*, *S. bryopteris* and *D. fimbriatum* were considered as focal species for the next steps of analysis.

Table 1. Plants that are referred to by the names that reflect the features of *Sanjeevani*. Only the Sanskrit names are given here, but while selecting this list names in other languages were also used²³

Botanical name	Common name (in Sanskrit)
<i>Cressa cretica</i>	<i>Sanjeevani</i> , <i>Amruthashraava</i> , <i>Rudanathi</i> *, <i>Madhushraava</i> , <i>Romaanchika</i>
<i>Selaginella bryopteris</i>	<i>Sanjeevani</i> , <i>Sanjeevani Bhoothi</i>
<i>Desmotrichum fimbriatum</i>	<i>Jeevaka</i> , <i>Jeeva</i> , <i>Jeevabhadra</i> , <i>Jeevavani</i> , <i>Jeevanthi</i> , <i>Jeevapatra</i> , <i>Jeeva pushpa</i> , <i>Jeevavardhini</i> , <i>Jeevadhathri</i> , <i>Jeevyaa</i> , <i>Rakthaanthi</i> , <i>Yashasya</i> , <i>Sukhankaari</i> , <i>Praanadha</i>
<i>Malaxis acuminata</i> [#]	<i>Jeevaka</i>
<i>Malaxis wallichii</i>	
<i>Microstylis wallichii</i>	<i>Jeevaka</i> , <i>Rishvan</i>
<i>Trichopus zeylanicus</i>	<i>Jeeva</i>
<i>Terminalia chebula</i>	<i>Jeevanthi</i> , <i>Jeevanika</i> , <i>Chethara</i>

Other species with names akin to *Sanjeevani* are as follows:

Jeevanti: *Leptadenia reticulata* (Asclepiadaceae), *Cimicifuga foetida* (Ranunculaceae), *Holostemma rheedii* and *Dregea volubilis* (Asclepiadaceae)^{18,21}.

Jeevanthica: *Tinospora cordifolia* (Menispermaceae), *Viscum articulatum* (Loranthaceae).

Jeevanpatra: *Putranjiva roxburghii* (Euphorbeaceae)²².

Jeevani: *Trema orientalis* (Urticaceae), *Litsea chinensis* (Litseaceae)¹⁸.

*According to *Geervana Laghu Kosha*, a Sanskrit, Marathi dictionary, *Sanjeevani* is a plant called *Rudanthee* or *Rudanthika*. *Shabdakalpadruma*, the encyclopedic Sanskrit dictionary, has the following entry on *Rudanthee*. It is a small shrub which oozes droplets of water in winter from leaves (hence the name *Rudanthika*: the weeping one) also called *Sravathova*, *Sanjeevani*, *Amruthasrava*, *Romanchika* and *Mahamamsee* with bitter, pungent, heat-generating, Astringent. It is believed to destroy germs, prolongs life and prevents the onset of old age.

[#]These species are linked with synonymy problems in the literature sources from where their common names were keyed in.

Table 2. Habitat, known distribution and medicinal value of the three chosen species.

Species	Habitat	Distribution	Medicinal value
<i>C. cretica</i> (family: Convolvulaceae)	Backwaters, salt lakes, dry plains, moist deciduous forests	Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu	Analgesic, tonic, enriches the blood and expectorant properties. Treatment of leprosy, asthma, biliousness, urinary discharges, external inflammation and pains ¹³
<i>S. bryopteris</i> * (family: Selaginellae)	Hills of tropical forests. Rare, in damp places in tropical moist deciduous forests	Arawalli mountains, Madhya Pradesh (Baster, Bilaspur, Hoshangabad)	Relief from heat shock, and burning sensation while urination, restoration of menstrual irregularities, easy delivery, curing jaundice ^{18,21}
<i>D. fimbriatum</i> (family: Orchidaceae)	Mountain ranges	The Western Ghats, North Eastern states	Pseudo-bulbs are said to be stimulant, tonic, astringent to the bowels and expectorant. Used in treating asthma, bronchitis, fever, burning sensations, biliousness, and diseases of the blood ¹³

*Another species, *Selaginella involves* that occurs in nearly all parts of India between altitude 1000 and 2000 m amsl, is believed to prolong life²⁴. Therefore the discussion on *S. bryopteris* could be extended to *S. involves* as well.

Habitat of Sanjeevani

In all the versions of the epic, invariably, Hanuman searched for the plant in a mountain region and hence it is likely that, if existed, it should have occurred along the mountain ranges (Table 2). Among the three species selected based on their reference in Indian languages, *C. cretica* may not stand the test as it occurs along dry tracts, mostly in the Deccan Plateau, and not along the mountain ranges. Thus *S. bryopteris* and *D. fimbriatum* stand out as two possible candidates (also see footnote of Table 2).

Sanjeevani as an effective medicinal plant

As argued earlier, *Sanjeevani* could be a conceptual term referring to a plant or a set of plants with a wide range of medicinal values, especially that of an invigorating tonic. The *Jeeva Sampada*¹³ database developed at our centre has details of about 1000 species of plants of India. We used this to examine the possible candidates from among these three species (Table 2). Accordingly, *D. fimbriatum* and *S. bryopteris* appear as the potential candidates.

Ability to 'resurrect' life

As is generally narrated in the epic, *Sanjeevani* is supposed to have 'resurrected' Lakshmana from a state of death. But this has been interpreted to infer that the herb is capable of 'resurrecting' life from death itself. However, the acclaimed ability of the herb can be interpreted in several ways and analysing these could drive us close to the possible nature of *Sanjeevani*.

It is unlikely that there was any herb potentially capable of resurrecting a dead Lakshmana, back to life for obvious reasons. Lakshmana was perhaps in a parallel state of death, but not dead. One such state that humans are known to enter and get back to normal is the 'Coma'. Medically less understood, coma is a state of unconsciousness where the body is physiologically active, but

the neural system enters into an inactive (but not dead) stage. There are a number of cases where patients in coma, caused by severe injury or illness, revert to conscious stage, as if the dead system switched back to life. The famous example is that of Sarah Scantin^{14,15}, who entered into coma during 1984 following an accident when she was 18 years old and remained in that state for about 20 years. She suddenly came back to 'life' during 2005. How this happened has remained a mystery. There are several such examples in recorded medical history¹⁵, where a person in an almost 'dead' stage, suddenly gains consciousness and comes back to 'life'. What causes coma is less understood, barring some associated physiological processes associated with it. However, it is believed that certain poisons or shocks can induce similar effects. In fact, traditionally people bitten by poisonous snakes or scorpions are not allowed to go to sleep, lest they do not slip into such an unconscious stage that eventually leads to death.

Thus it is likely that Lakshmana was in such a stage of unconsciousness or coma owing to the heat shock, or poison, of the arrow and that *Sanjeevani* had properties capable of awakening or rejuvenating (and in that sense 'resurrecting') him. It is also likely that owing to similarities of the syndrome of this stage with that of death, story tellers have termed the herb as a 'life giver'. Accordingly, if *Sanjeevani* does exist, it should have the ability bringing coma patients back to normal living state.

Similar cures similar

One of the strong tenets of the ancient Indian and other traditional systems of medicine was the principle of 'similar cures similar'. Similar that of the 'Doctrine of Signature', it essentially means that a plant with syndromes similar to the afflicted organ or disorder in question, can be effectively used to cure the disease in human patients^{16,17}. Therefore, we hypothesized that the so-called *Sanjeevani* had the ability of resurrecting itself from a state of near death situation and hence the ancient



Figure 1. a, *Selaginella bryopteris* (herbarium specimen). b, Dry material that looks almost dead can come alive green, when given water (source: www.4krsna.wordpress.com).

Table 3. Extract from the Tropicos website on *Flickingeria fimbriatum*

<i>Desmotrichum fimbriatum</i> : Orchidaceae
<i>Desmotrichum fimbriatum</i> Blume, Bijdr. Fl. Ned. Ind. 7: 329, t. 329. 1825
Type: Java: in sylvis humilioribus provinciarum occidentalium Javae, Floret Jun–Sep.? (T: ?)
<i>Dendrobium nodosum</i> Dalzell, Hooker's J. Bot. Kew Gard. Misc. 4: 292. 1852 India
<i>Ephemerantha fimbriata</i> (Blume) P. F. Hunt & Summerh., Taxon 10: 103. 1961
<i>Flickingeria fimbriata</i> (Blume) A. D. Hawkes, Orchid Weekly 2(46): 454. 1961
<i>Flickingeria nodosa</i> (Dalzell) Seidenf., Dansk Bot. Arkiv 34(1): 41. 1980



Figure 2. *Flickingeria fimbriata* (Blume) A.D. Hawkes 1961 SECTION *Plicates*. Photo by © Eric Hunt. Source: <http://www.orchidphotos.org> (on permission through e-mail).

doctors, on the principle of ‘similar cures similar’ used it to cure coma in Rama, Lakshmana and others. Accordingly, we examined if any of the shortlisted plants has such an ability.

Incidentally there are a set of poikilohydric plants that can dramatically resurrect from almost dead-dry stage to normal condition on hydration. These have attracted the attention as sources of drought-tolerant genes and are a subject of intense study by crop physiologists, ecologists and biochemists. For instance, *Myrothamnus flabellifolia*, one such poikilohydric plant, remains in ‘dead’ stage for almost several months in nature, but can turn green and come to ‘life’ dramatically when the rains arrive or when hydrated. We surmized that *Sanjeevani* could be one such poikilohydric plant because of which the ancient doctors perhaps used it to cure the syndrome of ‘death’ or coma stage. Interestingly, *S. bryopteris* is known to be a poikilohydric lithophyte¹⁸ occurring along the mountains and in fact, this herb is sold for this peculiar feature in several markets in India mostly in places of pilgrimage such as Rishikesh, Hardwar and Varanasi.

S. bryopteris, thus appears to possess the traits prescribed by the criteria we have set for searching *Sanjeevani*. It is a mountainous plant, referred to as *Sanjeevani* in Sanskrit and other local languages, has a number of medicinal values and exhibits an ability to resurrect itself from a stage of death, though its ability to cure coma is not recorded. Several workers have been investigating its potential in promoting recovery from shocks. Shah *et al.*¹⁸ have found that rat and insect cells subjected to UV radiation and oxidative stress of H₂O₂ could recover well when treated with extracts of this herb. Several workers have shown that the oxidative stress could lead to neuro-degeneration

and hence recovering the cells from its impact could have implications in recovery from the disorders related to the neural system¹⁸⁻²². Therefore, *S. bryopteris* could be an effective herb in preventing neuro-degeneration. However, there is no evidence as yet to illustrate its possible effect in recovering patients from the state of coma or unconsciousness. We could only suggest that this could be one course of useful investigation on this herb.

Thus among the three herbs chosen, *S. bryopteris* appears to be a relatively strong candidate for *Sanjeevani*, though *D. fimbriatum* also satisfies most of the criteria: it is an epiphytic orchid that occurs in the mountains and has a number of medicinal uses. But it has not been consistently called by the term *Sanjeevani* and hence may only be second in choice. *D. fimbriatum* also suffers from taxonomic problems (Table 3). First described by Blume in Jawa in 1825, it was also described in 1928 by Gamble from the forests of Western Ghats. However, taxonomists have failed to recover it and hence propose that the specimen described by Gamble could in fact be *Flickingeria nodosa*. There are other synonyms for the plant and its identity seems to be under confusion. Hence we suggest that investigations can be focused on *S. bryopteris* for examining it as a possible candidate for *Sanjeevani*.

Finally, we have not addressed here the issue of whether or not *Sanjeevani* exists. Rather we have proceeded on the assumption that *if it be true*, we should not miss out on such an important resource and on the logic that the cost of searching is worth even if we fail in our attempts compared to the benefits we may derive *if it be true*. Further, we are aware that our search may not be complete and our approach may not be the best; there may be other, better ways of searching which we think are worth attempting. However, with the criteria and we set up for the search, it appears there are at least two species, viz. *S. bryopteris* and *D. fimbriatum* as potential species representing *Sanjeevani*, on which more work could be attempted.

1. <http://www.hindustantimes.com/StoryPage/StoryPage.aspx?sectionName=NLetter&id=1a3c40ee-3604-4c41-8c8d-e82cf269b418&Headline=Has+Ramdev+done+what+Hanuman+couldn't+%3f>
2. <http://cognosist.wordpress.com/2007/11/16/sanjeevani-is-selaginella-bryopteris-is-it-true/>
3. There was a time when even the Buddha was considered a non-historical figure by the Western Academicians. Human societies retain memories of great events and personalities in the form of colourful legends and folklore. In this sense, Rama and the *Ramayana* would indeed be a colourful history of a great personality and his life.
4. There is a reference to *Sanjeevani* (or *Mruth Sanjeevani*) in Valmiki's *Ramayana* in the Shloka 29 to 34 of the 74th Chapter of the 'Yuddakandha'. Reference has been made to four different herbs in this section, viz. *Sanjeevani* (or *Mruth Sanjeevani*; healer of wounds and the one that resurrects the dead); *Sandhanakarani* (restorer of the skin and joints); *Savarnyakarani* (restorer of the colour of the skin); *Vishalyakarani* (remover of arrows: *Shrimad Valmiki Ramayana*, vol. 3, pp. 217-230). The other versions referred to are: *Kannada Valmiki Ramayana*, 1985, vol. 2, ed. C. N.

Srinivasa Aiyangar, published by D. V. K. Murthy, Krishnamurthipuram, Mysore; *Valmiki Ramayana* in Kannada, vol. 9, Bharatha Darshana Mudranalaya, Bangalore.

गत्वा परममध्वानमुपर्युपरि सागरम् । हिमवन्तं नगक्षेत्रं हनुमन
गन्तुमर्हसि ॥
ततः काञ्चनमत्यु मुषक्षं पर्यतोत्तमम् । कैलासं िखरं चापि दुक्षस्यरि
निषूदन ॥
तयोः िखर्योर्मध्ये प्रदीप्तमनलत्पभम् । सर्वोषधीयुतं वीर
दूक्षस्योषधिपवेतम् ॥
तस्य वानरार्दूल चतस्रो मूर्ध्नि संभवाः । दूक्षस्योषधमो दीत्वा
दीपयन्त्यो
दि गोद र ॥
मृतसंजीवनीं चैव वि ल्यकरणीमपि । सावर्ण्यकरणीं चापि
संधानकरणीमपि ॥
तः सर्वं हनुमन गृह्य क्षिपुमागन्तुमर्हसि ।

(You should go a long way over the ocean, and having reached Himavaan, the greatest of all mountains, you will see the great Rishabha mountain, the lofty range of gold, and you will see the peak of Kailasa too, O Destroyer of the foe! Between those two peaks, you will find the mountain that is the home of all medicinal herbs, the mountain that glows with unparalleled brightness. You will see O tiger among the apes! four flaming herbs glowing on its top, that light-up the ten directions. They are the Mruthasanjeevani (the healer of wounds), *Sandhanakarani* (restorer of the skin), and *Savarnyakarani* (restorer of the colour of the skin) and *Vishalyakarani* (the remover of the arrows). You should gather them.)

5. In the *Mahabharata*, another great Indian epic, there is a reference to the *Sanjeevani Vidya* (art of *Sanjeevani*), which was adopted by *Shukracharya*, the preceptor of Demons, to revive all the demons killed by the Gods.
6. Sharma, D. P., *The Search for Lanka*, Print India, New Delhi, 1985. Sharma argues that the Lanka mentioned in the epic is not the present Sri Lanka, but an island along the east coast near the Godhavari river delta.
7. Hanuman is the monkey God according to the narration in the epic, but the fact that Rama and his people were continually and actively communicating at ease with him and his relatives and clan members, suggests that this was a metaphoric representation of a native tribe of Deccan India who were perhaps melanic, strongly built and forest-dwelling and hence different from the northern people. Ganeshaiyah, K. N., 'KapiLipiSaara'. In *Sudha*, 2008.
8. Said to be a poisonous arrow by some versions and heat-shock arrow by other versions.
9. There is no consensus on where he searched for this in India; some versions suggest that he visited the Himalayas; but the fact that he was familiar only with South India, could suggest that he landed somewhere along Sahyadri range or its extensions.
10. This has been exaggerated to indicate that he carried an entire mountain. It is also true that he brought with him other plants as well, viz. *Vishalyakarani*, *Suvarnakarani* and *Sandhanakarani*. While the last of these is mentioned as a group of plants in *Charaka Samhita*, we do not consider these as candidates for the following reasons: (a) they do not seem to have consistency in their mentioning in other literature sources. (b) It was *Sanjeevani* that was eventually used to cure Lakshmana. (c) There are no phonetic synonyms used consistently for these names in different languages and sources.
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MEETINGS/SYMPOSIA/SEMINARS

33rd Annual Conference of the Australasian and South East Asian Tissue Typing Association (ASEATTA 2009)—MHC Genomics and Human Health – Emerging Diagnostic and Therapeutic Applications

Date: 12–15 November 2009
Place: New Delhi, India

Major themes: HLA-associated disease susceptibility; MHC and infection; Human diversity and MHC polymorphism; Solid organ and hematopoietic stem cell; Transplantation; Structural and functional aspects of MHC; Population genetics; Genetics of autoimmune diseases; Cytokine genes and immune response; Gene and cell therapy; Immunity and cancer.

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Date: 19–31 October 2009
Place: Hyderabad

The Networking Resource Centre is organizing an NMR School. The school will consist of lectures, tutorials and practice sessions. Students pursuing a research program (M Phil, Ph D, Post-doctoral) are invited to apply. Participation is limited to 20 students. Selection will be made based on academic record and research experience. Preference will be given to applicants from colleges and universities.

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