

## Morphological Differences and Medicinal Applications of three *Sansevieria* Species found in the Holy Cross College Campus, Nagercoil

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### ABSTRACT

*Sansevieria* is a cosmopolitan genus that occurs in Africa, the Middle East, and the Asian subcontinent. The diversity in form is rather astonishing, ranging from tiny little plants, some with stout, spiky leaves and others with thin, flat ones, to formidable shrubs 2-4 m in height. This group of plants together within the genus *Sansevieria* are the similar flowers and seeds, but some believe that the flowers and seeds aren't so unique to exclude larger. Many species have water-resistant leaf fibres that are sometimes used in the manufacture of ropes and for bowstrings, and several are grown as ornamentals for their attractive foliage. This study aimed to describe the variations of *Sansevieria* species - *Sansevieria trifasciata*, *Sansevieria cylindrica* and *Sansevieria roxburghiana* based on morphological character.

**Keywords:** *Sansevieria trifasciata*, *Sansevieria cylindrica* and *Sansevieria roxburghiana*, Morphological character

### Introduction

Morphological variation is the study of the physical form and external structure of plants. Morphological variation in plants is generally a feedback for the changing climatic conditions and reflects the adaptive evolution [1-3] while the soil factor has apparently shown to be a driving force to determine the morphological traits of plants [4,5].

*Sansevieria* is a genus of xerophytic perennial herbs occurring in dry tropical and subtropical parts of the world. It consists of about 70 species with a distribution ranging from Africa through Asia to Burma and the islands of the Indian Ocean [6,7]. The habitats of *Sansevieria* are often described as open, sunny places, but frequently with subsurface soil availability. It also include termite mounds, river banks and rocky outcrops [8]. Some habitats mentioned by [9], such as sandy areas near seashore and uplifted coral plateaus.

*Sansevieria* is known variously as bow-string hemp, snake plant, zebra lily, mother in law's tongue, cow tongue, leopard lily, devil's tongue, good luck plant, etc. [10,11]. Members of *Sansevieria* are of great economic importance as ornamentals, as a source of fibre and as medicine for curing different ailments. *Sansevieria* species are among major foliage ornamentals mainly due to the variegated and mottled leaves [12] and the interesting wide variation in leaf shape. *Sansevieria trifasciata* Prain. is the most common species found

cultivated in gardens or pots, particularly *S. trifasciata* var *laurentii* (De Wild.) N.E.Br. The mottled, erect and stiff leaves of *Sansevieria* are used a great deal in artistic flower arrangements.

*Sansevieria* are a source of white strong elastic fibre commonly used in the manufacture of rope, fishing lines, cordage, fine matting, bowstring, and clothing [8]. In addition, [13-15] stated the use of *Sansevieria* fibre in making fine paper. *Sansevieria* species have horticultural value, *S. cylindrica*, *S. roxburghiana*, *S. zeylanica* are grown as ornamental plants. *Sansevieria* species are slow growing plants using the Crassulaceae Acid Metabolism (CAM) pathway. *Sansevieria* species are also used for a variety of medicinal purposes throughout the genus' geographical range.

## Materials and methods

### Plant materials:

The plants were collected from Holy Cross College (Autonomous), Nagercoil campus. They were sampled for study.



*Sansevieria roxburghiana* Schult



*Sansevieria trifasciata* Prain



*Sansevieria cylindrica* Bojer ex Hook

## Morphological Variation and Medicinal importance:

### Taxonomical Hierarchy of *Sansevieria trifasciata* Prain

Kingdom	: Plantae
Phylum	: Tracheophyta
Class	: Liliopsida

Order	: Asparagales
Family	: Asparagaceae
Genus	: <i>Sansevieria</i>
Species	: <i>trifasciata</i>

### **Distinguishing Features**

*Sansevieria trifasciata*, commonly called snake plant or mother-in-law's tongue, is native to tropical western Africa. It is a stemless evergreen perennial that, with proper care, will last for many years. In its native habitat, plant foliage may rise to as much as 4' tall, but is often smaller (to 2' tall) on indoor plants. Erect, fleshy, sharply-pointed, sword-shaped leaves are deep green with light gray-green horizontal stripes. Leaves rise stiffly in a rosette from a thick rhizome. Small, fragrant, greenish-white flowers bloom on mature plants in spring, followed by orange berries. Flowers and fruit rarely appear on indoor plants. Leaves in each plant 2-6, much broader than thick, fleshy to rigidly coriaceous, dark green, with numerous very conspicuous, light or greyish-green, irregularly confined transverse bands, in the normal form with a narrow dark green margin; large leaves linear-lanceolate, 40-175 cm × 2.5-9 cm, base channelled, margins entire, apex acute. Raceme erect, 40-75 cm long (peduncle included); flower-fascicles scattered or arranged group-wise; pedicel 6-8 mm long, articulated at about the middle; perianth 2.5-3 cm long, greenish-white, scented, divided just below the middle; lobes narrowly linear, broadening towards the greenish tip; stamens 7-8 mm long; style 15-18 mm long. Berry globose, 7-9 mm in diameter, orange, 1-2-seeded. Seed globular-ellipsoid, 6-7 mm × 5 mm, cream-brown. Rhizome sympodial, robust, yellowish-red.

### **Medicinal Uses:**

The plant parts are used for the treatment of ear pain, swellings, boils, fever, ulcer, jaundice, pharyngitis, skin itches, urinary diseases, bronchitis, asthma and food poisoning. The plant is used to treat ringworm and fungal diseases. The leaf sap is applied directly on infected sores, cuts and grazes, it is also used to treat fungal and scabies infections [16].

It is also used for management of hypertension [17], anti-inflammatory treatment [18], thrombolytic activity [19], protection against carbon tetrachloride induced liver injury [20], anti-oxidant activities [21], antifungal properties [22], antiulcerative activity [23], analgesic and antipyretic activities [24], antidiabetic activity [25], treatment of corns [26], anthelmintic activity [27], antiallergic, anti-anaphylactic activity [28], antibacterial activities [29] and antimutagenic activities [30].

**Taxonomical Hierarchy of *Sansevieria roxburghiana* Schult.**

Kingdom	: Plantae
Phylum	: Tracheophyta
Class	: Liliopsida
Order	: Asparagales
Family	: Asparagaceae
Genus	: <i>Sansevieria</i>
Species	: <i>roxburghiana</i>

**Distinguishing Features**

*Sansevieria roxburghiana* Schult commonly called as Indian Bowstring Hemp, Bowstring Hemp. Found on rocky slopes, scrub jungles and hedges from plains to 1400m. It is a stemless evergreen perennial plant, producing fleshy, erect, rigid leaves 45- 75 cm or longer, and 2.5 cm wide, arising from a rhizome, leaves 6-24 over the life cycle, those of juvenile plants and the outer ones of a tuft spreading, others usually ascending; blade stiff, linear-oblong, 20-60 cm × 1-2.5 cm, deeply concave channelled down the face, rounded or slightly keeled on the back, margins entire and with age becoming narrowly whitish, apex tapering to a soft point, green, with transverse darker green rather regular bars on both sides and with 6-11 longitudinal dark green lines on the undersurface and often 1-3 on the upper. A fibre is obtained from the leaves. Raceme spike-like, 30-75 cm long (peduncle included), lower part with 4-5 erect acuminate sheaths 1-2 cm long; flowers 3-5 in a cluster; pedicel up to 8 mm long, jointed near the middle; tube 6-7 mm long; lobes linear, 8-9 mm long, greenish tinged with purple; stamens about 7 mm long, anthers dorsifixed; flower stalks 6 – 9 cm long, joined, ovary obovoid, 1.5 mm long, stigma simple, obscurely lobed. Berry globose, up to 6 mm in diameter.

**Medicinal Uses**

It has various traditional uses and recently various pharmacological uses are pursuing. Traditionally it is used as a cardiotonic, expectorant, febrifuge, purgative, tonic in glandular enlargement and rheumatism etc. The plant is known to possess antitumor, antibacterial, antidiabetic, antimicrobial, anticancer, antioxidant and analgesic activity.

The medicinal uses of *S. roxburghiana* Schult include treatment for abdominal pains, earache, diarrhoea and hemorrhoids traditionally, in treating ear aches and hemorrhoids, the leaf of this plant is heated and the warm juice is squeezed onto the affected area. The roasted leaves of *S. roxburghiana* Schult are used as an emollient. Root stocks are used as cough medicine in India. Juice of tender shoot is administered to children to clear their throats to clear

phlegm, as a febrifuge, tonic and purgative. In India, tender roots and rhizome are used as expectorant and in bone setting [31]. In viral diseases associated with nasal discharge, slightly warmed leaf juice is used as nasal drops [21].

### **Taxonomical Hierarchy of *Sansevieria cylindrica***

Kingdom	: Plantae
Phylum	: Tracheophyta
Class	: Liliopsida
Order	: Asparagales
Family	: Asparagaceae
Genus	: <i>Sansevieria</i>
Species	: <i>cylindrica</i>

### **Distinguishing Features**

*Sansevieria cylindrica*, commonly called bowstring hemp, is a rhizomatous, succulent perennial native to tropical southern Africa. Mature clumps will reach up to 6' tall and spread to fill a 2' area. Will slowly form dense colonies from underground, spreading rhizomes. The grey-green leaves have variable, horizontal, dark green stripes and are cylindrical in shape, narrowing to a point at their tips. The leaves emerge from a fan-shaped rosette and can reach up to 6' tall and 1" wide. An upright, spike-like inflorescence will emerge from the center of the rosettes rarely if grown indoors or seasonally if grown in the ground outdoors. The inflorescences can reach up to 3' tall with 1" long, tubular, white blooms. Plants are sometimes grown in braided forms.

### **Medicinal Uses**

The plant is effective against treatment for caries, small pox, snake bite, stomach cancer, inflammatory conditions, influenza, cough, ear pain, swellings, diarrhea, boils and fever and also this plant possess antihelminthic, antirheumatic, diuretic, laxative, vermifuge, antibacterial activity [32], antitrypanosomal activity [33], antioxidant and antidiabetic activities [34,35], antimutagenic effect [30], cytotoxic activity [36].

## **4. Other Benefits**

### **1. Air-Purifiers**

NASA recommended the *Sansevieria* species as air-purifiers. They clean the air from toxic substances, particularly benzene, formaldehyde, xylene and trichloroethylene. While cleaning the air, it also provides high levels of humidity and oxygen to the room. These properties of snake plants keep the surroundings clean and fresh.

## **2. Home Decor**

The architectural and tall shaped leaves of these plant make it perfect for corners of the home and office. There are various kinds of snake plants; smaller ones like cylindrical or bird's nests are appropriate for an office desk or darker areas of the house.

## **3. Drought Tolerant**

These plants require very less water. Overwatering is the major cause of its death. It is a high drought-resilient plant, even in summers. They are ideal to have, even if you are facing scarcity of water or in offices where regular watering can be difficult.

## **4. Grows in a Wide Range of Humid Conditions:**

*Sansevieria* species can grow in a wide range of humid conditions. They do well in humid climates such as bathrooms and drier ones in the office. When placed in a humid environment, waterless and have extra drainage to reduce stagnant water. In dry areas, water deeply and more but only between soil drying.

## **5. Easy to Propagate**

Every species of snake plant is easy to propagate. There are two ways of propagating the plant: leaf cut/rhizome cut. Cut the rhizomes (offset) as close to the stem as possible. Leave them in a glass jar with water to develop bigger roots, and then plant them in a pot with good drainage. Similarly, you can place the leaf-cutting in the glass jar to develop roots and then plant it or plant the leaf directly in the pot.

## **6. Symbolic of Good Virtues**

It is believed that the first plant from this species was cultivated in China and was greatly treasured by the nurturers for its symbolism. The one who cares for the plant is granted eight virtues of longevity, prosperity, intelligence, beauty, art, health and strength.

## **7. Effective for Allergies**

It absorb carbon dioxide and toxin particles from the air while releasing oxygen into the air. When you breathe fresh air, there are fewer chances of developing allergies and airborne diseases. Thus snake plant naturally decreases the onset of allergies.

## **8. Low-Maintenance**

These plants are low-maintenance plants. They can thrive without water and sunlight. They are the best low-maintenance plants you could nurture. Place them in any condition, and it would bless you with its rare beauty and air-purifying properties.

## 9. Absorbs CO<sub>2</sub> at Night

It reduce CO<sub>2</sub> levels at night by absorbing it. It is because of Crassulacean Acid Metabolism (CAM), the capability to perform a certain type of photosynthesis that drought-tolerant, succulent plants like *Sansevieria trifasciata* perform.

## 10. Anti-Cancer plant

As you have come to know that plants from *Sansevieria* species clean the environments of cancer-causing agents like toluene, xylene, benzene, formaldehyde make it an effective anti-cancer plant

## Conclusion

The morphological variation gives the comparative physical form and external structure of plant. Morphological variation is commonly influenced by genetic variation, environmental variation, or the interactions between them. The present study depicts that there is a variability in terms of morphology among the three species. The primary causes of this variation is may be due to positional effects, environmental effects, and juvenility.

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