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Sansevieria: The Unique Indoor Plant

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Abstract

Sansevieria name is derived from that of Duke Raimondodi Sangrio, Prince of Sanseviero (Italy). It is also known as snake plant and mother in law's tongue. There are more than 100 species in this genus native to Tropical and South Africa. According to Chinese people, the snake plant is one of the lucky plants that help to bring good fortune, were grown and cherished well before the Chinese Ti-plant (*Dracaena spp*.) also known as good luck bamboo. It is perennial herb with stiff, ornamental leaves. Sansevieria tops the list as being most tolerant of all decorative plants to survive the most unsuitable growing conditions. The durability of Sansevieria makes it an excellent choice for apartment dweller that often have limited success with house plant due to lighting issues. Snake plant is classic yet versatile house plant with sword like foliage design. It is excellent for forgetful gardener and it's considered a top air purifier plant for indoor environment and also eliminates considerable amount of benzene, formaldehyde, trichloroethylene and toluene. Placing *Sansevieria trifasciata* in the office could reduce the CO_2 concentration by 10.47% to 19.29%. A clean air study conducted by NASA showed that snake plants are one of the few plant that convert carbon dioxide into oxygen at night, which make them perfect to place in bedroom.

Introduction

Sansevieria trifasciata in the process of photosynthesis, through stomata it absorbs pollutants and micro-fungi. Leaves of *Sansevieria trifasciata* contain active substance pregnane glucoside which decompose toxic substances such as carbon-dioxide, benzene and formaldehyde into amino acids that are no longer harmful to humans. The name is derived from that of Duke Raimondodi Sangrio, Prince of Sansevierio. There are more than 100

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species in this genus native of tropical and South Africa. According to the Chinese people, the snake plant is one the lucky plants that help bring good fortune. Sansevieria were grown and cherished well before the Chinese Ti-Plant also known as good luck bamboo. Sansevieria are collectively known as 'Snake Plant' because of their long leaves and tapered end. Sansevieria are commonly known as Mother-in law's tongue and Bowstring hemp. The durability of Sansevieria makes it an excellent choice for apartment dweller that often have limited success with houseplant due to lighting issues. Sansevieria tops the list as being the most tolerant of all decorative plants to survive the most unsuitable growing conditions. It is classic yet versatile house plant with sword like foliage design. It is considered a top air purify plant for indoor environment. Mother-in-law's tongue, or snake plant (*Dracaena trifasciata*, formerly *Sansevieria trifasciata*), is a popular houseplant with yellow-striped leaves and tiny pale green scented flowers. It is sometimes sold as *Sansevieria*. Several former *Sansevieria* species are popular houseplants in temperate regions, with *Dracaena trifasciata* the most widely sold; numerous cultivars are available. In China, the plant is usually kept potted in a pot often ornamented with dragons and phoenixes. Growth is comparatively slow and the plant will last for many years. There are two main varieties: wild type sansevierias have stiff, erect, scattered, lance-shaped leaves while the bird's nest sansevierias grow in rosettes. As houseplants, sansevierias thrive on warmth and bright light, but will also tolerate shade. They can rot from over-watering, so it is important that they are potted in well-drained soil, and not over-watered. They need to be re-potted or split at the root from time to time because they will sometimes grow so large that they break the pot they are growing in. Other former *Sansevieria* species are less common in cultivation. Another species is *Sansevieria cylindrica*, which has leaves which look quite different from *D. trifasciata*, but is equally tough. Plants can be propagated by seed, leaf-cutting, and division. Seeds are rarely used, as plants can normally be grown much faster from cuttings or divisions. As many cultivars are periclinal chimeras, they do not come true to type from leaf cuttings, and therefore must be propagated by rhizome division to retain the variegation. According to a NASA Clean Air Study, along with other plants such as golden pothos (*Epipremnum aureum*) and corn plant (*Dracaena fragrans*), *Dracaena trifasciata* is capable of purifying air by removing some pollutants such as formaldehyde, xylene, and toluene. Sansevierias use the crassulacean acid metabolism process, which absorbs

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carbon dioxide at night, although oxygen is released during daylight. Nighttime absorption of CO_2 purportedly makes them especially suitable bedroom plants. However, since the leaves are potentially poisonous if ingested, they are not usually recommended for children's bedrooms. Not only do indoor plants enhance the overall appearance of a space but they've been shown to boost moods, increase creativity, reduce stress and eliminate air pollutants. As modern indoor environment is virtually sealed and the construction material used, modern synthetic furnishings and everyday household products such as cleaning material that produce harmful substance which are trapped inside the building which causes many health related problems. Polluted indoor air, contaminated by volatile organic compounds (VOCs) are the major cause of headache, nausea, sore and itchy eyes, loss of concentration and other symptoms. The simple addition of indoor plants is a natural way to remove these pollutants like trichloroethylene, benzene, CO_2, toluene *etc*.

Some important points about *Sansevieria*

Sansevieria spp.	**Features**
S. trifasciata	Plants erect with long leaves, leathery, linear-lanceolate, deep green to grey-white waxy cross bands
S. trifasciata 'Golden Hahnii'	A very showy variety forming elliptical short leaves, rayish green with longitudinal band of cream and golden yellow
S. trifasciata 'Hahnii' Common name**:** Bird's nest sansevieria	Rosette of smaller but broad spirally short leaves, dark green with pale green cross-band and slightly grooved
S. trifasciata 'Laurentii'	An attractive plant with cluster of sword-shaped erect leaves having longitudinal band of yellow along the border, centre grey-green with deep green cross-bands
S. trifasciata ' Silver Hahnii' Common name: Dwarf silver snake plant	Leaves are larger but slightly narrower, stiff, almost entirely pale silvery green, very pretty

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S. patens	This type of Sansevieria plant is identified by its cylindrical fleshy leaves that grow in rosette form, leaves can reach up to 3 ft.
S. ehrenbergii Common name: Sword snake plant	It has a short stature, only growing 4-6" tall. The short, green leaves having V-shape with a slight red tint on the leaf edges and leaf tips, and they arise on the stem in an alternating pattern
S. metallica	It has linear, pointed leaves occur in rosettes. Leaves are stiff, leathery and 3 - 4 cm wide. They have a striping pattern of grey and greyish green of varying width
S. zeylanica Common name: Bowstring hemp	Elongated pale silvery green leaves marbled with dark blackish green markings
S. cylindrical Common name: common spear plant	Rigid leaves 1 m long, 3 cm thick, circular in outline, grooved, tapering at apex, dark green with grey-green cross bands, becoming less conspicuous with age

Propagation

By offsets:

Stem which eventually have new plants on their ends grow underground or parallel with ground for considerable distance. Offsets are new, virtually complete baby plants, at the base of parent plant. These offsets are clones, they are identical to the parent plant.The easiest way is to detach offsets from the rhizomatous rootstock and pot them up.

By Rhizomes:

Take apart a plant with multiple growth. Separate the plants into individuals. Cut the plants in such a way so it can get maximum length of rhizomes. Propagate rhizome cutting in the beginning of the active growing season, when the days are lengthening, temperature is warm and plants are very actively growing

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By Leaf Cutting:

Cut 2 to 4 inch section of the leaf and put it in some moist potting soil. Keep this evenly moist but not wet and in several weeks to month, small plantlets willbegin to grow from the base of the cutting. These can be separated into individual plants.

How to care snake plant?

- **Light:** Sansevieria are well known for coping with direct sun and low light conditions, although bright light conditions with some sunlight and shade is preferred
- **Temperature:** As native of tropics, these plants thrive in the warmth conditions. It performs well between 18℃ to 26℃
- **Watering:** Keeping the plant moist but not wet because this plant is a succulent and it stores water within its foliage. So, it is not necessary to keep the soil damp
- Not to over water as this can cause the rotting of root and base of the plant.
- **Potting and repotting:** For better drainage add two part of coarse sand or perlite, one part of coconut coir and one part of soil-based potting mixture
- Plants repotting is advisable when the leaves occupy most of the pot surface. If the roots are packing the pot so that little soil is visible, repot them immediately. This procedure is best to done in early spring
- When plants are not repotted, top dress them with fresh potting mixture, first scrapping away some of the loose old mixture carefully so as not to do any damage to near-surface roots.

Indoor air pollution and their causes

U.S. Environment Protection Agency (EPA) studies show that the levels of pollutants in indoor environments can be between 5 to 100 times greater than outside air. World Health Organization (WHO) states that indoor air pollution is 1000 time more able to reach the lungs

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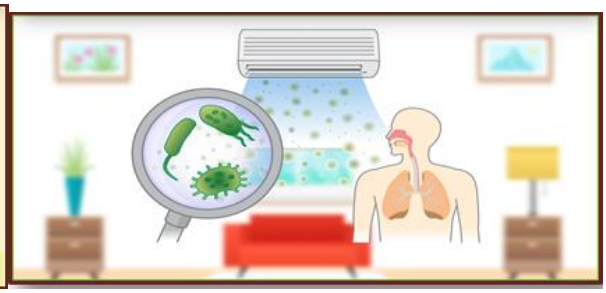
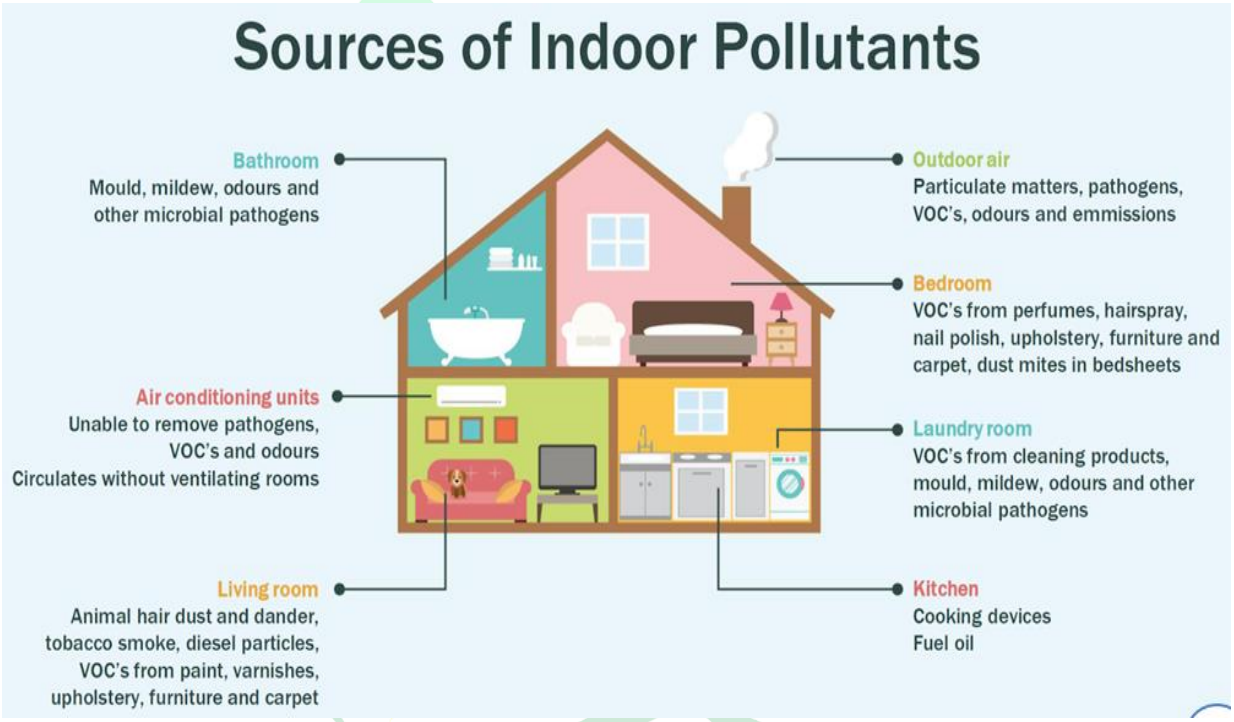
than outdoor air pollution. Poor indoor air quality can lead to a variety of health referred as sick building syndrome.





Health issue related to indoor air pollutants

Air Pollutants	Symptoms
Trichloroethylene	Headache, vomiting, drowsiness and coma
Formaldehyde	Irritation in nose, mouth and throat in severe cases swelling of the lung
Xylene	Irritation to mouth and throat, dizziness, **heart problems**, liver and kidney damage

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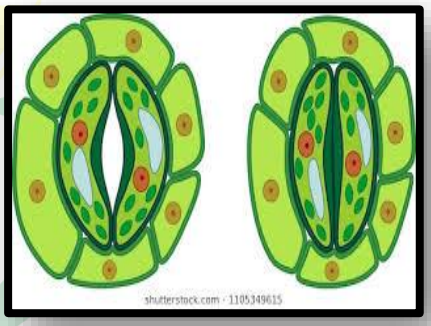
	and coma
Ozone	Coughing, **throat irritation**, discomfort in the chest when taking a deep breath
Benzene	Drowsine**ss**, dizziness, increase in heart rate

Absorption mechanism in plants

- Indoor plants are known to absorb air pollutants via their stomata during normal gas exchange
- Several pollutants have been shown to be sequestered in situ or after transfer to other locations in the plant
- The process mechanism involves toxic chemicals absorbed by the plant through stomata and then transferred to the roots where the microbes break down the wide varieties of unhealthy compounds into simpler molecules which could be reabsorbed by plants.



Air purification

According to NASA Clean Air Study, along with other plants such as golden pothos (*Epipremnum aureum*) and corn plant (*Dracaena fragrans*), sanke plant (*Sansevieria trifasciata*) are capable of purifying air by removing some pollutants such as formaldehyde, xylene and toluene. Sansevieria have the crassulacean acid metabolism process, which absorbs carbon dioxide at night, night time absorption of CO2 makes them especially suitable bedroom plants. However, since the leaves are potentially poisonous if ingested, they are not usually recommended for children's bedroom.

Specific plants	**Where to keep them**
Chlorophytum comosum	Living space and store room

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Dracaena marginata	Living room
Hedera helix	Near bathroom and toilet
Aspidisra elatior	Kitchen
Sansevieria trifasciata	Bedroom

Natural Air Purifiers

Botanical Name	Common Name	What they filter
Nephrolepis exaltata	Boston fern, sword fern or fishbone fern	These tropical ferns removes especially formaldehyde and xylene
Phoenix roebelenii	Pygmy date palm or Robellini	This palm is capable of removing formaldehyde
Sansevieria trifasciata	Snake plant, Mother in law-tongue	An ideal bedroom plant as these not only removes VOCs but also replenishes oxygen at night times too
Sygonium podophyllum	Syngonium	Remove VOCs, improve humidity
Spathiphyllum	Peace lily	Remove benzene, CO and formaldehyde
Chamaedorea seifrizii	Bamboo palm, cane palm or reed palm	Removes benzene and trichloroethylene

NASA clean air study recommendations

Spathi phyllumwallisi

Anthurui mandreanum

Epipremnu maureum

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Sansevieriatri fasciata

Aglaonema commutatum

Dracaena marginata

Chlorophytum comosom

Nephrol episobliterata

Rhapis excelsa

Source: Wolverton (1989), USA

Conclusion

There are many indoor plants that are useful for indoor decoration and removal of air pollutants in which Sansevieria effectively removes benzene, toluene, trichloroethylene and other VOCs. It is hardy plant that grows in insufficient light, dry air and drought condition *etc*. It has CAM mode of photosynthesis so, it absorbs CO_2 and release O_2 in night time too, so it is ideal bedroom plant. It shows minimum rate of change under benzene stress and absorbs higher CO. Sansevieria also inhibits the growth of aerial pathogenic micro fungi like *Cladosporium spp*., *A. fumigatus, A. flavus etc*. In propagation, middle leaf segment gives longest shoot length and maximum leaf area whereas, apical segment gave more number of root per segment, fresh and dry weight of roots in soil:compost media for indoor culture. In offices, houses, and other indoor settings without vegetation, the air quality deteriorates significantly. Poor air quality not only triggers health issues but also exacerbates existing conditions. In the United States, the Environmental Protection Agency has ranked indoor air pollutants amongst the top five threats of public health. Without air purification, pollutants such as chemicals, building materials, bio effluents, and household products open a new can of worms. Snake plants have tiny pores called “stomata” that open and close while the photosynthesis process occurs. These pores are used for the gas interchange of carbon dioxide

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and oxygen. But these same stomata openings are also one of the critical ways that plants can actually uptake air pollutants.