

Genus *Vernonia* - Mini Review

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ABSTRACT

Vernonia is one of the largest taxa under Asteraceae family with approximately 1000 species. This taxon is commonly distributed in South America, Africa, Southeast Asia, and North America. *Vernonia* species are widely used as leafy vegetables especially in some of the African countries. Some species of *Vernonia* has been used in traditional medicines to treat variety of ailments. In many countries, including India this plan has turned up into obnoxious weed. Species of *Vernonia* consists of phytochemicals such as fats, proteins, fats, amino acids, minerals, fibres, vitamins, and carbohydrates.

Key words: Genus *Vernonia*, Asteraceae, Morphology and ethnomedical applications.

INTRODUCTION

Genus *Vernonia* belonging to the daisy family of Asteraceae was named after famous English Botanist William Vernon and was established by a German naturalist, Johann Christian Daniel von Schreber in 1791. It comprises of about 1000 species which are distributed in tropical and sub-tropical countries. *Vernonia* commonly known as ironweed plants have special features to identify, leaves are tooth shaped with purple colour flower with head inflorescences. Several botanists consider the genus *Cyanthillium* as a synonym of *Vernonia*, while other opines in treating both genera as distinct. The former is distinguished from *Vernonia* by its smooth to finely 5-striate (vs. 5-10-ribbed) achenes, and by its echinolphate (vs. tricolporate) pollen, and by base chromosome number

usually reported as $2n = 18$ or 20 (vs. $2n = 34$). This species is of common occurrence on meadow, along the streams in exposed or shaded conditions in wastelands, cultivated land and along with road sides. This plant completes its life cycle within one or two seasons.

Habit in different geographical conditions

This taxon is found to be of common occurrence in South America, Africa, Southeast Asia, and North America. Within the single genus, the species exhibits a great variability in habit as well as morphology (Dematteis and Pire, 2008; Angulo and Dematteis, 2009; Martucci et al., 2014; Nwakanma et al., 2018). The species are mainly herb to shrub, while woody climbers, scramblers and trees are rarer. Mainly this is characterised by herbaceous plant body which completes its life cycle within a year or two.

For the herbaceous members, they are generally not more than a foot tall and have a single composite capitulum inflorescence. For shrubby and tree members, the plant possesses multiple stems and flower heads and may reach an average height of 9 feet, the stems do not branch until after the terminal flower head is formed. Such a tremendous variation in habit and growth forms had led to diverse criteria of taxonomic delimitation.

Economic exploitation

Some of the species of *Vernonia* are used as leafy vegetables especially in the nations of Africa where they are used as pot herbs.

Several species have been used as traditional medicines to treat variety of ailments such as inflammation, fever, cold, cough and gastro-intestinal problems (Kirtikar and Basu 1918). They are also used as remedy for spasms of the urinary bladder and plants are combined with quinine to cure malaria. The whole plant in decoction form is used for the treatment of kidney stones, stomach pain. Juice of the whole plant is given to children with urinary incontinence (Ahmad et al., 2011, Tekou et al., 2018). It also possesses anti-helminthic, expectorant, laxative, diuretic, and tonic properties (Nadkarni 1954).

Vernonia is cultivated for seed oil crop in tropical and sub-tropical countries where the seed yield varies 1.7 to 2.5 T/h. The seeds contain about 40- 42% oil out of which 73 to 80% vernolic acid. It could also serve as a natural source of plasticizers and stabilizers (binders) for producing polyvinyl chloride (PVC plastic), which currently is manufactured from petroleum. Reports have claimed certain species namely, extract of *V. amygdalina* exhibits anti-cancerous activities in human breast cancer cell lines through Caspase-Dependent and p53-Independent pathways (Cheng Wong et al., 2013).

Phytochemical Properties

Leaves, stems and roots are *Vernonia* are enriched with proteins, fats, fibres, amino acids, minerals, vitamins, and carbohydrates. The phytochemical studies on this plant reveal the presence of flavonoids, saponins, alkaloids, tannins, phenolics, terpenes, steroidal glycosides, triterpenoids, and several types of sesquiterpene lactones (Farombi and Owoeye 2011).

In fact, studies have revealed that antioxidant and hypolipidaemic properties of the plant are due to the presence of flavonoids, tannins, saponins, and triterpenoids (Igile et al., 1994; Erasto et al., 2007; Ijeh et al., 2011, Alara et al., 2017).

Environmental Requirements

Vernonia prefers growing within 20 degrees north or south latitudes of the equator, however it has grown successfully in broader areas, comprising of the subtropics and tropics. The plants have been found to be suitably adapted even to semi-arid areas. This plant prefers porous, well-drained soils for successful growth, preferably alluvial soil. On well-drained and porous soil, they are found to grow into erect habit with a single stem, terminated by flower head, followed by the development of lateral branches. On poorly-drained soils, terminal growth ceases before flowering. Mostly the upper part dies before branching and flowering. Low seed-sets are yielded in poorly drained soils unlike properly drained soils. They can withstand low rainfall as low as 20'annually. However adequate moisture must be present in the soil for good stands and permitting the first flower heads on each stem to mature (Teynor et al., 1992).

CONCLUSION

The success story of *Vernonia* to adapt in a diverse array of environment has made a tremendous impact in the biosphere where we are living in. In many countries, including India this plan has turned up into obnoxious weed. In fact, *Vernonia* is one of the largest taxa under Asteraceae family with approximately 1000 species (Bisht and Purohit 2010). Proper attempt needs to be taken so that the plant can be utilized in judicious way for the betterment of the society than being a weed.

Declaration by Authors

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