

**General Article**

**CALLIGONUM POLYGONOIDES LINN: AN IMPORTANT RARE SHRUB SPECIES IN THAR DESERT OF INDIA**

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**ABSTRACT**

*Calligonum polygonoides* Linn. is a shrub in habit but sometime old age plant look like a tree, locally known as “Phog”. The plant has food value locally; its buds and seeds are used by local people. “Raita” can be prepared by its buds. Seeds are usually eaten raw. Branches of *C. polygonoides* are used in zinc purification. The most beneficial role of this plant in desert region is as soil binder on sand dunes of Western Rajasthan and to increase soil fertility. Sore-gums can be cured by decoction of this plant.

**Keywords:** *Calligonum Polygonoides*, Distribution, Economic Importance

**INTRODUCTION**

*Calligonum Polygonoides* Linn. belongs to the family Polygonaceae. The Polygonaceae is known as Buckwheat, Smartweed or Knotweed family. It is locally known as Phog, Phogala or Phogaro (Bhandari, 1978). Usually it is seen as a small glabrous, winter shedding, perennial shrub 3-4 feet high with whitish, articulate and fragile branches. Sometimes a small tree with 12-15 feet in height and a trunk with 2-3 feet in girth (Parker, 1918) but according to Jussieu (2001) it is usually 1 to 2 m high but occasionally may reach even 3 m in height with a girth of 30 to 60 cm. It is highly drought and frost resistant in its native habitat in the Rajasthan desert. It is the most common component of plant communities of Psammophytic scrub desert and grows on longitudinal transverse and parabolic dunes (Saxena and Singh, 1976). It grows well in absence of any type of vegetation and is dominant biomass producer of the sandy areas of the desert (Khan, 1997).

**Distribution**

It is a geographically cosmopolitan, distributed from the tropics to the arctic. Although most of the species are concentrated in the Northern temperate region (Heywood, 1978). According to Shetty and Singh (1991) four genera of Polygonaceae are distributed in Rajasthan, out of which *Calligonum* (one species), *Polygonum* (fourteen species), *Rumex* (two species) and *Emex* (one species) naturally. Excluding these four genera, six more genera cultivated as ornamental purpose.

It is distributed throughout the Southern Europe, North Africa, Western and Central Asia as main diversity centre (Brandbyge, 1993). In Thar Desert, it is represented by one species *i.e.*, *Calligonum polygonoides* L. (Shetty and Singh, 1991). *C. polygonoides*, bestowed the status of key-stone species of Indian desert (Bhandari, 1995). Historically, it was the dominant woody perennial shrub in active sand dunes and stabilize sand fields in most of the desert area (Khan, 1997; Tao *et al.*, 2000). It grows well in absence of any type of vegetation and dominant biomass producer of the sandy areas of the desert (Khan, 1997). The plant has been quoted in Red Data Book of IUCN as endangered plant species due to its large-scale exploitation in Indian Arid zone (Singh, 2004; Ravikumar and Goraya, 2008).

*Calligonum polygonoides* is distributed in the desert region of Western Asia extending over the Southern Punjab and Western Rajasthan in India, Boogtee Hill in Pakistan, Northeast Afghanistan, Persia, Armenia and Syria (Hooker 1885; Cooke, 1901-1908; Duthie, 1960; Gamble, 1972; Talbot, 1976). According to Talbot (1976), *C. polygonoides* is generally distributed in Northwest India, Tropical Arabia, Algeria, Egypt, Ethiopia, Somalia and Mali.

The western part of Rajasthan is arid region of India. It lies between 24°N to 35.5°N and 70.7°E to 76.2°E. This region covers 12 administrative districts (Barmer, Bikaner, Churu, Jaisalmer, Jalore, Jhunjhunu, Jodhpur, Nagaur, Pali, Sikar, Sri Ganganagar and Hanumangarh) of Rajasthan. In Rajasthan *C. polygonoides* shows its occurrence in Barmer, Bikaner, Churu, Jaisalmer, Jaipur and Jodhpur districts

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(Shetty and Singh, 1991). It grows on sand dunes as a psammophytic vegetation of Barmer, Bikaner, Churu, Jaisalmer, Jhunjhunu, Nagaur, Sikar and Shri Ganganagar (Shankarnarayan, 1988). This shrub is more predominant in the districts of Jaisalmer and Bikaner than elsewhere (Sen, 1985).

The distribution of *C. polygonoides* is reduced very fast because the demand of its roots for charcoal as well as overgrazing and sand mining (Tadevosyan, 2001).

### Economic Importance

*Calligonum polygonoides* is also named orta in old Arabic poems. Therefore most of the people agree with arabic origin of Aorta for the great human artery (Khan et al., 2013). It is the most important source of food for sustenance during frequently occurring famines and is valued for commercial and medicinal uses (Bhandari, 1990; Bhandari, 1995; Kumar et al., 2005; Goyal and Sharma, 2008). According to Srivastava (2006) unripe fruits of *C. polygonoides* have a vast nutritive value such as protein (18%), carbohydrate (71.1%), fat (64%), fiber (9.1%), Vitamin B<sub>2</sub> (0.7mg/100g), calcium (670mg/100g), phosphorus (420mg/100g) and iron (12.7mg/100g). Abortive flowers and succulent fruits are eaten during food scarcity by famines in arid regions of India. The flower buds locally called as “Lasson” in the desert area mixed with butter milk (whey) adding some salt during summers (Singh and Pandey, 1998). Flowers made into bread or cooked in clarified butter or coconut oil to make a local delicious preparation (Beval et al., 2008).

Roots and thick branches are used as fuel. The aqueous paste of plant acts as an antidote against the heavy dose of opium and poisonous effects of *Calotropis procera*. According to Katewa and Galav (2005), the plant extract is used in typhoid. Plant decoction is given to animals to cure urinary problems. Floral buds give cooling effect to the body and cure sun stroke (Singh et al., 1996). To control sun stroke a dose of 50gm floral buds in 100gm curd is very effective (Kumar et al., 2008).

According to Mohil (2013) flowers are very nutritious with high amount of proteins, bearing digestive and tonic properties, useful against asthma, cough and cold. Medicinally, it is used for treating eczema and juice of shoot is used for eyes as an antidote to scorpion sting (Yawer et al., 2007; Kumar et al., 2008; Bewal et al., 2009; Singhi and Joshi, 2010). The decoction of plant after boiling is used as gargle for the sore-gums by Bhil and Garasia (Bhandari, 1978; Singh and Pandey, 1998). The plant is largely consumed for fire-wood by the natives of the desert. According to Khan et al., (2013), it is locally used for fuel and Naswar preparation.

The plant contains Calligonoides, teracosan-4-olide, steroidal ester, beta-sitosterol glucoside and ursolic acid (Yawer et al., 2007). According to Samejo et al., (2011) the plant is a rich source of flavonoids (flowers, buds, seeds and stem), alkaloids (root, flowers, buds and seeds), proteins (flowers and seeds), tannin, steroids, phenols, carbohydrates and terpenoides (roots, stem, buds, flowers and seeds). In total, 27 compounds were analyzed qualitatively and 10 compounds were analyzed quantitatively. It accounts for 68.42% and 82.12% total contents of the essential oils of buds and roots, respectively. It contains a complex mixture of terpenoids, hydrocarbons, phenolic compounds, acid derivatives and ketones. The main component of essential oil was ethyl homovanillate (11.79%) in buds and drimenol (29.42%) in roots (Samejo et al., 2013).

The wood of the plant is used in building huts/shelter and scaffolding of wells and other structures. The branches are eaten by camel and goat frequently (Bhandari, 1978).

Therefore, by the above mentioned utilities of *Calligonum polygonoides* Linn. the cultivation of this plant is required greatly in Thar Desert of India.

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