

Effect of Seed Pre-Treatment and Time of Sowing on Germination and Biomass of *Cassia angustifolia* Vahl. in Arid Regions

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Abstract: Studies have been conducted to develop seed germination and suitable agri-silvi practices for *Cassia angustifolia* in arid areas under rainfed and irrigated conditions. Seeds were found dormant due to physical reasons and gave poor germination without any pre-treatment. The germination can be enhanced (>80%) by mechanical scarification, hot water and acid pre-treatments. Green seeds in the lot showed slightly poor germination as compared to yellow seeds. Seeds of tested seedlots without treatment gave 22% to 41% germination and average mean germination time was from 4.1 to 5.1 days. However, pre-treatments enhanced the germination percentage and reduced the mean germination time in almost all the lots. Various experiments were initiated with different spacing (30 x 30 cm, 30 x 45 cm and 45 x 45 cm), date of sowing (July, August and September) and irrigation trials. In another experiment various agroforestry tree species namely *Acacia nilotica*, *Prosopis cineraria*, *Azadirachta indica* and *Eucalyptus camaldulensis* have been selected for experimental trial with a single frequency of irrigation (after 1st plucking) in 3 replication and RBD design.

Key words: *Cassia angustifolia*, seed germination, agri-trials, arid region, pre-treatments.

Senna (*Cassia angustifolia* Vahl.) is an important leguminous (Caesalpiaceae) species native to Sudan, South Arabia, North Africa, Somalia, Ethiopia, Egypt and other neighboring countries is one of the selected plant species. The plant is found growing in wild state in certain coastal parts of Gujarat especially in the Bhuj region of India. The plant can be cultivated all over the sub-tropical areas of India. Senna is a fast growing and spreading Indian shrub of which seeds, pods and leaves are extensively used for pharmaceutical applications (Tripathi, 1999; Kinjo *et al.*, 1994; Arya, 2003;). The seeds have been found to be an alternative source of commercial gums (Chaube and Kapoor, 2011). Senna is one of the most commonly used laxative drugs in the Eastern and Western countries for the treatment of constipation (Pareek, 1983). Commercially available consists of the dried leaflets of Alexandria senna (*Cassia acutifolia* Delile) or Tinnevely senna (*Cassia angustifolia* Vahl.). The phytoconstituents principally responsible for its characteristic action is two anthraquinone glycosides namely; sennoside A and sennoside B. Sennoside A and B together are responsible for upto 40-60% activity of crude senna (Kinjo *et al.*, 1994). The sennosides had been extracted from senna leaves, stems,

Pods, buds and flowers (Agarwal and Bajpai, 2010). Sennosoid contents in senna varied with time of sowing, collection and storage conditions (Upadhyay *et al.*, 2011). Leaves are used as purgative drug in eastern and western countries. Senna also contains small quantities of other anthraquinones such as sennosides C and D, rhein 8-glucoside, rhein 8-diglucoside, aloe-emodin, 8-glucoside, anthrone diglucoside and rhein. Senna also contains naphthalene glycosides, flavonoid, phytosterols, salicylic acid, mucilage, resin and calcium oxalate (Babash *et al.*, 1985; Arshi *et al.*, 2006; Upadhyay *et al.*, 2011).

Senna is cultivated in coastal districts of Tirunelveli, Ramanthapuram and Madurai in Tamil Nadu. Although successful cultivation has been demonstrated in many parts of western India, its commercial cultivation has recently come up in Kutch, Gujarat and Jodhpur, Jaisalmer and Barmer districts of Rajasthan (Arya, 2003). It can grow over sand- after rainy season and can be maintained as a perennial crop for 2-3 years. Agricultural developments in hot arid region is challenging task and certain other land-uses to enhance income of rural farmers is essential for their livelihood support. Cultivation of senna due to good growth even under non-irrigated conditions

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