RESEARCH PROGRAM ON Livestock

CGIAR

ICARDA

Science for resilient livelihoods in dry areas

PASTORAL AND AGRO-PASTORAL SYSTEMS

CGIAR RESEARCH PROGRAM ON LIVESTOCK

Aims to increase the productivity of livestock agri-food systems in sustainable ways across the developing world.

Managing rangelands: promoting native shrub species

Bassia prostrata (L.): A resilient drought and salt tolerant shrub use for rangeland improvement and for provision of quality fodder for livestock

Arid and semi-arid rangelands face increasing climate variability and grazing pressure as the world's demand for food increases. ICARDA is introducing drought-tolerant species as a crucial means of assisting rangeland rehabilitation efforts, helping to conserve rapidly-depleting water resources and maintain grazing at sustainable levels. The result: a win-win situation for rural communities and the environment.

Benefits:

- Drought resistant
- Salt tolerant (optimally 150 mM)
- High quality feed
- Available during fodder scarcity
- Can grow in many soil types
- Rehabilitation and possible reclamation of salt effected soils
- Can sustain heavy grazing
- Has an extensive fibrous root system which improves soil stability
- Can be used as fire break

***Bassia prostrata* (L.) Schrad.**

Common names:
Prostrate summer cypress, desert bush

Locations:
Temperate Semiarid and Arid Eurasia and the Mediterranean

Bassia prostrata is a perennial chenopod that grows in the arid and semiarid areas of Eurasia and the Mediterranean. It occurs naturally in saline, sandy, rocky, and poor soils of Central Asia. It is a long lived (life span 7-12 years) semi-evergreen semi-shrub of 0.3 to 1 m tall. It is a drought and medium salt tolerant C4 species. Above ground biomass and seeds are a source of protein that can improve animal quality. As a result it is popularly used in rangeland rehabilitation efforts and is thought to have potential for reclamation of salt-affected soils. It also has an extensive fibrous root system which improves soil stability. While further studies are still lacking, optimal salt concentrations of 150 mM of salt have been reported. Concentrations of 200 mM of salt lead to a significant decrease in growth.

Naturally grown *Bassia prostrata* (L.) at Uzbekistan

Restored pasture with *Bassia prostrata* (L.), Tutli village, Uzbekistan)

Bassia prostrata (L.) seeds

Many parts of the plants are consumable year round. Young stems, leaves, and fruits have a high calorie content for sheep, goats, and camels. *Bassia prostrata* has been reported to have fall and winter crude protein levels higher than 70 g/kg which is needed for gestating ruminants. It has been reported to contain 14.4-15.6% crude protein in the budding stage. Leaves contain 14.7% protein. It is a good source of fodder units as 100 kg of dried forage contained 45.1-67.5 fodder units and 9.68% of digestible protein. The nutritional value of the forage can be helpful when supplementing or mixing with low quality grasses, as is common in times of fodder scarcity, especially in winter season. Forage yields have been reported from 1,000 to 1,800 kg/ha in areas with 100-200 mm of precipitation. *Bassia prostrata* grows well in association with other arid fodder species in natural and planted communities of artificial pastures phytocoenosis.

Silvopastoral management

It is best to plant seeds in formant fall or winter plantings to get good seedlings establishment for growth in the spring. In autumn and early winter, after the first rains or snowfall have moistened the top 15-20 cm of soils, seeds are sown directly without soil cultivation. Sheep then trample the sown area to pit the seeds into the soil; this is an effective and cheap way of obtaining proper germination and minimizing loss of valuable seeds. Seeds can be broadcast, aerially seeded, or drilled into a lightly disturbed surface at 1.5-2 cm but always less than 5 cm.

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Use the current year's seeds that still have high germination rate. Flowers bloom from June to September. To improve seed viability is it best to keep seeds with low water content at cold temperatures for not more than 8 to 10 months. Seeds that are not properly stored loose viability by 80-90%. Moistening seeds prior to germination treatments improved success.

The plant can sustain heavy grazing on sown pastures and in native forage plant communities. However spring grazing is more detrimental to the shrub and is not as common since grasses are available at that time. Plants grazed to less than two inches will have reduced growth the following year. It is best when grazed to 70-80% utilization. The preference of the plant increases throughout the summer to the early fall. The earliest grazing normally occurs in late June to mid-July when the grasses are not available. They are planted in some dry areas as a fire break, to slow down grass fires. The plant will sprout and regrow after burning.

Effective Maintenance

- Store seeds dry, cold, and not more than 8-10 months
- Moisten seeds prior to germination
- Do not graze less than 5 cm above ground
- Let the shrub rest in the spring for greater productivity

ICARDA's Rangeland Ecology and Management Unit

ICARDA's Rangeland Ecology and Management Unit aims to address the unsustainable use of resources induced by adverse effect of climate change and an increasing demand for food and feed in the dry areas. ICARDA programs promote the enhanced quality and productivity of crop, forage, livestock, and the improved management of water resources through close cooperation with farmers and national researchers.