RESEARCH PROGRAM ON Livestock

CGIAR

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

Managing rangelands: promoting well-adapted shrub species

Scientific name:
Atriplex leucoclada Boiss.
Common names:
Wild Orache, Raghl
Location:
East Saharo-Sindian and Irano-Turanian species

Atriplex leucoclada: mitigating highly saline soils

Atriplex leucoclada is one such native biennial and palatable halophyte species in the Mediterranean region. Due to its easy and rapid establishment in both saline and degraded rangelands, it is being used as a source of feed, especially in autumn and winter, when forage for grazing is very low.

An increase in human population has directly contributed to as much as 50% of arid rangeland vegetation loss, thus increasing grazing pressure and degradation levels.

Low resource tolerant shrubs present a significant potential to enhance rehabilitation efforts, livestock production,sustainability and to mitigate the negative environmental effects of intensified agricultural and animal production.

Atriplex leucoclada is one of most planted native Atriplex species in degraded rangelands of West Asia. It is a drought, salt and high heat-tolerant shrub, and yielding low to high edible biomass. It is a biennial plant and its height usually ranges between 30 and 100 cm. Its stems are prostrate to erect and it has bluish-gray leaves which have high protein content (12-22%). Due to its high water-use efficiency and ability to produce high dry matter quantities, it regenerates well after grazing/browsing. It occupies sandy soils, effectively stabilizing severely disturbed rangelands and controlling erosion. It is characterized by its short growing season and has a limited grazing period from April to June, after which it reduces its productivity levels.

Benefits:

- Easy and quick to establish
- Palatable
- Grows in the semi-deserts and dry steppes
- Adapted to saline-alkaline soils or extremely arid habitats
- Used for soil conservation and as medicinal plants
- Excellent to feed livestock due to its high protein content

Sheep grazing *Atriplex leucoclada*

Atriplex leucoclada seedlings

Atriplex leucoclada seeds

Establishment and management

The most used propagation technique for *Atriplex leucoclada* is by transplanting seedlings, as its dormancy reduces the effectiveness of revegetation from seeds. Fluctuating daily temperature could break seed dormancy induced by the hard testa and facilitate germination. Where soil conditions are not ideal, germination resistance of the resulting seeds is high, thus delaying the build-up of vegetative cover. Planting density affects its mean yield per plant, which tends to decrease as densities increase from 2,500 to 10,000 plants/ha. It is well adapted to desert environments, with thick and almost cartilaginous leaves covered by dense trichomes and by salt crystals that completely cover the leaf blade. It flowers between March and October and its seeds mature thereafter (between September and November. *Atriplex leucoclada* can grow and reproduce under rainfall conditions ranging between 100 and 300 mm/year, with yields varying from 1,000 to 3,000 kg of dry matter/ha per year.

Atriplex leucoclada has a high ability to absorb nitrogen from the soil and can benefit from the action of nitrogen-fixing microorganisms. It forms an efficient root system, with fine roots close to the surface (0–50 cm) and one taproot down to 5m deep. This way, *Atriplex leucoclada* shrubs are able to access resources both in the shallow soil and also deep in the soil horizon. Its growth in height increases the proportion of woody tissues, causing a decrease in leaf production and leading to plant senescence.

Use and management

The plant exhibits high forage value and it is one of the best range plants from the chenopodiaceous family. It is grazed by all livestock classes (camel and small ruminants). Livestock especially consume its dry and green forage during the dry season in arid rangelands. It has a high nutritional value and the ability to be grazed in summer. It is characterized by relatively high digestible protein, which is comparable to that of Alfalfa. It is considered among the decreasers due to its very low resistance to overgrazing. Appropriate management of this shrub species requires a rest period from grazing, and pruning at 25-50 cm above the soil. This allows the fewer leaves left on the shrub to grow on the higher parts of the plant, thus reducing moisture loss through transpiration.

Effective Management

- Clean, dry and treat seeds with fungicides for storage
- Treat seeds to break dormancy e.g. scarification
- Re-sprouts well after grazing/browsing
- Rest a minimum of three months between grazing/browsing events

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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.