RESEARCH PROGRAM ON Livestock

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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 highly palatable species resistant to harsh desert climatic conditions

Gymnocarpos decander Forssk.: a highly palatable species facilitating the establishment of annuals vegetation under arid climate

Gymnocarpos decander **is a perennial, cushion-shaped dwarf shrub from the family of Caryophyllaceae. It grows in rocky and stony soils without sand and on limestone cliffs up to an altitude of around 1,500 m and avoids direct salt influence and sandy soils.**

Scientific name:
Gymnocarpos decander Forssk.
Common names:
Bushy Gymnocarpos
Locations:
North Africa and the Middle East and Mediterranean basin

Benefits:

- Highly resistant to harsh climatic conditions
- Highly resistant to grazing
- Wind control and reduction of detrimental erosion
- Highly palatable
- Wide biological and medicinal activities
- Highly rich with regard to nutrient Ca and Mg in spring
- May be used to reduce desertification processes
- Increases plant diversity via facilitation mechanism

Known as Jarad, it is a floral element of the Saharo-Arabian region, which is found in Algeria, Egypt, Libya, Morocco, and Tunisia on the African mainland, and in Afghanistan, Iran, Jordan, Oman, Pakistan, Saudi Arabia, and Syria in Asia. G. decander is an erect undershrub, suffrutescent, much branched, and grows to a height of 30 to 50 cm. Stem and branches are rough, ash gray, entangled, and knotted at the nodes. The leaves are opposite or tufted, fleshy and terete, sessile, 5 to 16 mm long, obtuse, entire, mucronate, and glabrous; stipules are small, membranous, and ovate-triangular with ciliate margins. The flowers are fleshy, sedentary, sessile, yellowish green, and with a vase-shaped receptacle.

Small succulent leaves and reddish-brown flowers of *G. decander*

Densely tufted *G. decander* heavily browsed

Sheep grazing *G. decander* steppe in southern tunisian

The fruit is a one-seeded membranous indehiscent utricle enclosed by persistent sepals, densely papillary, and orange-brown in color. The seeds are ellipsoidal and dark brown.

The young branches of Gymnocarpos are frequently eaten by camel and goats. Gymnocarpos is grazed readily by livestock all year, but the animals turn to it in particular in late summer due to its small, succulent leaves, when the tastier annuals have finally disappeared. In addition to its higher palatability, Gymnocarpos has economic value since it is used as fuel wood. It also has some traditional uses, such as against helminthiasis, kidney stones, psychosomatic diseases, and to break down an evil eye and bad spirits. Moreover, it is distinguished by its potential antimalarial efficacy because of its hydroalcoholic and polyphenols content as well as antioxidant and antimicrobial activities.

Nutritional composition

Gymnocarpos decander contains 92.5 percent dry matter (DM), 12.44 percent ash, 10.04 percent crude protein (CP), 39.64 percent neutral detergent fiber (NDF), 348.38 percent acid detergent fiber (ADF), 9.92 percent acid detergent lignin (ADL). It is a good source of minerals including iron, calcium, manganese, zinc, magnesium, copper and sodium (1129.1, 47.96, 33.61, 11.15, 7.75, 5.66 and 1.58 g/kg respectively).

Contact

Dr. Mouldi Gamoun International Center for Agricultural Research in the Dry Areas (ICARDA). M.Gamoun@cgiar.org
Dr. Mounir Louhaichi, International Center for Agricultural Research in the Dry Areas (ICARDA). M.Louhaichi@cgiar.org

Establishment and Management

The flowering period of Gymnocarpos extends from February to May. Seeds mature and disperse over short distances in summer (late June to July). After seed dispersal they may remain in the soil and start germinating during winter (December to March) when the monthly average temperatures are favorable, and the probabilities of rainfall are higher. Germination of seeds is related to the ecological conditions of the natural habitat. Seeds cannot germinate under elevated salt concentrations, regardless of the photoperiod. Seeds can germinate with a maximum success rate of 60 percent under sunlight when the temperature is between 20 and 30°C. However, germination cannot exceed 30 percent under a high temperature regime of 35°C and above. Seedlings are able to survive under harsh desert climatic conditions. By transplanting seedlings, G. decander may be used in rehabilitation programs of degraded lands.

Effective Management

- Highly sensitive glycophyte
- Unable to germinate when salinity is ≥ 100 mM
- Maximum germination is achieved at moderate temperature between 20 - 30°C
- Seed bank persists in the soil for one year

ICARDA's Rangeland Ecology and Forages (REF)

The REF team promotes advances in rangeland ecology and pasture management in the dry areas. This series of factsheets is dedicated to the characterization of promising range and forage species aimed at alleviating the feed gap, limiting water runoff and soil erosion, restoring degraded rangelands and maintaining a healthy ecosystem.