

## RESILIENT AGROSILVOPASTORAL SYSTEMS

### CGIAR RESEARCH PROGRAM ON LIVESTOCK

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

## Managing agrosilvopastoral systems: promoting forage legumes species

### *Astragalus cicer* L.: excellent perennial forage legume resistant to grazing

*Astragalus cicer* has great potential to provide forage because of its strong perenniality, winter hardiness, drought tolerance, considerable resistance to some insects that attack other species of forage legumes, non-bloating traits, relatively high forage yield, nitrogen-fixing ability, and compatibility with cool-season perennial grasses.

*Astragalus cicer* is an ideal species for long-term pastures and disturbed lands. About 50% of its total yield is produced in the first growth period of the season. *Astragalus cicer* is a very competitive legume,

### Benefits:

- Moderately salt tolerant
- Drought and cold tolerant
- Is competitive in mixed planting systems
- Is used for soil conservation through reducing erosion
- Is excellent feed livestock due to its high protein content
- Long lived (at least 30 years)



(Photo credit: Stefan Lefnaer)

**Scientific name:**  
*Astragalus cicer* L.  
**Common names:** Cicer milkvetch, chickpea milkvetch & wild lentil  
**Location:**  
Native to eastern Europe

widely recommended as a component of mixtures for the revegetation of disturbed lands, and it is also one of the most winter-hardy species of cultivated forage legumes. Generally, its mature seeds are bright golden-yellow in color, but sometimes they have a light-greenish tinge. With its seeds flat to rounded in shape, it has a high seed production potential, with about 450 to 675 kg ha<sup>-1</sup>. Its rhizomes make mature stands very grazing resistant and competitive with many grass species. It has a branched taproot, with the upper portions of the primary root reaching a diameter of 2.5 cm or more. Its hollow, succulent stems can reach a length in excess of 1 m. The mean number of leaflets per leaf is about 25, with a range of 15 to 35. There is little variation in flower color, which ranges from white to pale yellow or cream.



*Astragalus cicer* at flowering stage  
Photo credit: Bruce Seed Farm, Inc.



*Astragalus cicer* flower  
Photo credit: Bob Sweatt



*Astragalus cicer* seeds  
Photo credit: Lornesperling

## Establishment and Management

It is recommended for areas receiving 250 - 330 mm annual rainfall. Large seeds or high in weight improves its emergence. Its hard seed coat permits the seed to remain viable for 12 years or more when stored at ambient temperature and low relative humidity.

*Astragalus cicer* seeds require mechanical or sulphuric acid scarification as its impermeable seed coat restricts water. After scarification, the seed loses viability rapidly, and thus should not be scarified until just before planting. The seeds should be planted in temperature ranges 15-25 °C for rapid and complete germination. Scarified seeds should be planted about 2 cm deep in a firm, well-prepared seedbed with 30 cm spacings between rows under irrigation and wider spacings under dryland. Seeding rates for pure stands of *Astragalus cicer* and *Astragalus cicer*-grass mixtures should be about 9 kg ha<sup>-1</sup>. Soil pH should be between 6.5 and 7.0 and high levels of Ca, P and K.

It should be harvested up to four times cuts annually for restoration of carbohydrate reserves. The exposure to sunlight influences its flowering, the shorter the exposure; the lower the flowering rates. It is susceptible to grasshoppers, as they feed on the flowers and developing seed pods before grazing the leaves. Also susceptible to crown rot and stem rot.

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## Feeding livestock

It maintains high quality forage throughout the growing season, making it useful as a late-season component in pasture mixtures with cool-season grasses and other legumes. In contrast with most other forage legumes, it does not cause bloat in ruminants. Although *Astragalus cicer* is slow to establish, it can survive with other forage crops in mixed stands. Its positive attributes, and its ability to withstand grazing, make this legume species particularly suitable for pasture. It is a cross-pollinated species, with seed set excellent under open-pollination conditions. Its seeds mature about 28 days following fertilization. This forage species does not contain toxic levels of anti-nutritional compounds such as tannins, oxalates, alkaloids.

## Effective Management

- Seeding rate should be about 10 kg ha<sup>-1</sup>
- Flowers between May and October
- Seeds mature in spring (September-November)
- Seeds need treatment to break dormancy eg. soaking in warm water
- Seeds take at least 20 days to germinate
- Should be cut 4-5 times annually

### ICARDA's Rangeland Ecology and Forages unit (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.