RESEARCH PROGRAM ON Livestock

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

Managing rangelands: promoting sustainable native tree species

Acacia cyanophylla: a multipurpose tree mainly used for reforestation of degraded landscapes

Scientific name:
Acacia cyanophylla Lindl.

Common names:
Blue-leaf wattle, Western Australian Golden Wattle

Location:
Western Australia

Legume trees are gaining considerable interest in agroforestry in the arid and Mediterranean regions, as they play a significant role in both agricultural and natural ecosystems by having a determinant role on the nitrogen cycle, being an alternative feed resource for livestock, and rehabilitating degraded ecosystems.

Acacia cyanophylla (also known as *Acacia saligna*) is one of three priority multipurpose tree species for arid and semi-arid zones. It is well adapted to semi-arid and sub-humid regions, and is a high potential species for use in restoration. Its cultivation could benefit livestock farmers as a strategic fodder reserve during the dry season, because its protein levels are high (15-21%). It is appreciated for its use as a fence, windbreak, and visual screen as well as for shade and shelter. It is also used for beautification projects and for combating desertification. Its leaves, seeds, and pods can be used as a livestock feed resource, while its wood is used for firewood, timber and charcoal production.

Benefits:

- Tolerates drought
- Grows in many different soils
- Achieves rapid growth
- Produces nutritious fodder
- Performs as a multipurpose tree

ICARDA
Science for Better Livelihoods in Dry Areas

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Seedlings production at nursery (Kairouan, Tunisia)

Goats browsing *A. cyanophylla*

Grinding *A. cyanophylla* biomass to make organic compost

Establishment and management

Acacia cyanophylla produces a large quantity of seeds. Its seeds should be stored in a cool dry place. The most used propagation technique is by seed, which requires seedling management in nurseries. It germinates well under direct seeding, although to facilitate germination and increase the germination chances, seed pretreatment to break dormancy is recommended. The most used treatment is sulfuric acid for 10 minutes, while seeds can also be scarified or boiled in hot water. It grows well on deep sandy-loam alluvia soils receiving an average of 150 mm annual precipitation. Flowering occur in early spring and late winter. At maturity stage, biomass production can reach up to 3.5 t DM/ha/year.

Acacia cyanophylla can regrow new shoots after being harvested (rotation of 4 years) and it needs to be protected from overgrazing. Its use of atmospheric nitrogen to enrich the soil makes it a pioneer species capable of colonizing nitrogen poor soils and barren sites, and thereby playing a particularly important role in the course of ecological succession, as it also rapidly establishes cover following major natural disturbances such as a fire. Its cultivation is located in the sub-humid and the semi-arid bioclimatic regions, as the species is highly resistant to drought and salinity. Fodder biomass production of *Acacia cyanophylla* is optimized by regular and annual harvesting. Because of its high tannin content, its fodder should not be used as a sole diet for animals.

Rehabilitating rangelands and feeding livestock

Acacia cyanophylla is a spreading tree, with an average height of 4-5 m. Its stem is usually highly branched while roots are very substantial in both area and depth, reaching depths of 7-8 m in the soil. Its bark is a smooth greenish-gray color, and the foliage is evergreen with relatively narrow leaves (usually 7-30 cm long and 2-20 mm wide). Utilized for soil stabilization in some instances, *A. cyanophylla* is also a species that can produce important biomass (woody and leafy), which can be used as green manure to enrich the soil, as fodder for cattle, and as a domestic energy source through firewood provision. Flowers are yellow, grouped in clusters, and appear in early spring. At maturity, it produces long brown pods with dark brown to black seeds. The advantages of the species are enhanced by the fact that, like most legumes, it is able to form a symbiotic association with rhizobia and thus fix atmospheric nitrogen, which enriches the soil.

Effective Management

- The trees coppice well after cutting
- Allelopathic effects may be exerted on undergrowth vegetation
- The species thrives on sands and soils with high pH
- Older plants are susceptible to gall rust
- Rodents and termites also attack the plant's roots
- Due to its tannin content, livestock diet should contain roughage and concentrate for enhanced energy efficiency

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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.