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Ximenia americana L.

Sacande, Moctar; Vautier, Helen

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SEED LEAFLET

No. 112 April 2006

MILLENNIUM SEED BANK PROJECT Kew

Ximenia americana L.

Taxonomy and nomenclature

Family: Olacaceae

Vernacular/common names: wild plum, blue sour plum and tallow nut (Eng.). Local names: olemo (Luo), mutoywo, mutenywa (Sebei), mtundakula (Swahili, Giriama, Digo), mukungambura (Kikuyu), madarau, madarud (Somali), ol-amai (Maasai), Tonga (Bambara), leanga (Moré).

Related species of interest: the other species of Ximenia native to Africa, *X. caffra* (large sour plum), is less spiny and with larger leaves than *X. americana*. The flowers are either solitary or in single stemmed groups whereas *X. americana* has branched inflorescenses.

Distribution and habitat

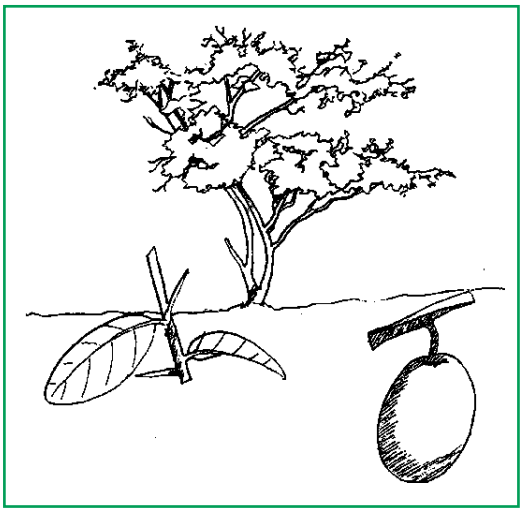
This species is widespread throughout the tropics: Africa, India and South East Asia to Australia, New Zealand, Pacific Islands, West Indies, Central and South America. It is mainly found in semi-arid bushland but also in many types of dry woodland, sandy open woodland, bushland, stony slopes and riverine and coastal thickets. It is frequently found on coastal dunes, along water courses and on stony slopes. It occurs at altitudes up to 2000m, and where rainfall exceeds 500mm per year. It grows on many soil types; however, they are often poor and dry. This species is a root hemiparasite, i.e. it is able to take water and nutrients from other plants through the roots, but does not depend on this for survival.

Uses

The heartwood is yellow-red to brown-orange, fine textured and regular. The wood is very hard, heavy and durable, and is used for tool handles. The timber usage is limited due to the thinness of the trunk. The wood is also used as fuel wood. The oil from the seed has multiple uses; it is traditionally used to soften leather, as well as being used as a cosmetic and skin ointment. The edible fruit is made into a type of beer, and the pulp is used in preserves and to make jellies. Bark, roots and leaves are used in local medicine, to treat ailments such as leprosy, fever, headaches, ulcers and skin complaints. An infusion of the leaves is used as an eye wash, and also for toothache and constipation. The tree is also planted as an ornamental, as hedge plant and for the shade it provides.

Botanical description

X. americana is a small tree or shrub, up to 6m tall, with zigzag branches. The bark is black or grey-brown, smooth when young, but becoming rough and developing fissures with age. It usually has stiff axillary spines; however, it is often unarmed when inland and towards the north of its distribution. The simple leaves are alternate or clustered on spur shoots. The seedling morphology is variable and when young the leaves are densely hairy, but they become smooth and shiny with growth. The pale bluish-grey leaves are typically 4-7.5 by 2-4.5cm, and are often folded upwards along the midrib. The apex of the leaves is rounded and slightly notched, the base is broadly tapering or rounded. When growing near the coast the leaves are often fleshy, however, when inland the leaves are thinner. Flowers are greenish-cream, scented and 5-10mm long; in small, branched inflorescences.



Ximenea americana. From Hines & Eckman (1993)

Fruit and seed description

Fruit: the yellow-red edible drupe is oval, approximately 2.5cm in diameter. Each fruit contains one large endospermic seed within its green pulp.

Seed: the seeds are c. 1.5cm by 1.0cm, and have a mean thousand seed weight of 600-800g; however, the weight varies depending on the environmental conditions during development. The seeds are endospermic, with a small embryo near the tip, and a thin testa. They have up to 60% oil content, and the seed coat ratio (seed coat mass/whole seed mass) is 0.36, on average.

Flowering and fruiting habit

The flowers are unisexual and male and female flowers occur on different plants. Flowering and fruiting varies between localities, but flowering typically occurs in the dry season. In Kenya flowering occurs in July and August, while fruiting takes place from January to April. In southern Africa flowering occurs in September to December, with fruiting taking place in December to February. In many places it flowers and fruits throughout the year. On good sites trees may produce fruit after 3 years of growth. The fruits are dispersed by animals.

Harvest

Yellow-red, mature fruits are collected by either hand picking, or shaking the branches to release the fruit.

Processing and handling

Seeds are after-ripened for 2-3 days after collection, until the fruits have reached full maturity. The fruits are kept at air temperature, high moisture levels and are ventilated. Care must be taken when after-ripening the fruit, since germination of the seeds can be reduced if the fruits are allowed to ferment. Therefore, the fruits should be processed as soon as they are ripe. The seeds are extracted by rubbing the fruit on a wire mesh to remove the pulp, and then washing the seeds in running water to remove the mucilage. The seeds can then be cleaned by hand sorting, and dried in either the sun or the shade.

Storage and viability

The seed is orthodox and should be stored at low moisture content and as cold as possible. It tolerates drying to 3.2% mc and temperatures as low as -20°C. For short term storage, the seed can be stored moist. It is essential for the successful moist storage of orthodox seeds that the seeds are ventilated frequently. After 17 days of moist storage in vermiculite at 26°C, germination was 100% (initial germination before storage was 93.4%). Seeds of this species have been stored in the MSB for nearly 20 years and X-ray analysis of the seed lots gave 90-100% viability.

Dormancy and pretreatment

Removal of the seed coat prior to germination or sterilisation of the seeds (e.g. by immersion in sodium hypochlorite for 5 minutes) can increase germination.

Sowing and germination

Germination is hypogeal. Seeds readily germinate between 26 and 36°C, with the germination rate being fastest at 31°C. Under such conditions the seeds germinate c. 90% in 8-30 days, in the laboratory or sown in sand in the nursery. When the seed coats are intact the seeds germinate in about 16 days, removing the seed coat reduces the germination time to about 10 days. It is not recommended, however, to remove the seed coat before sowing as it may damage the seed and reduce germination.

Table 1. Germination data from MSB.

Pretreatment and storage conditions	Temp (°C)	Germination (%)
Storage at -20°C	26	80
Desiccated	26	80-88
Seed coat removed	26	94
Untreated	26	87
Untreated	11	0

X. americana seeds. Photo: H. Vautier.

Selected readings

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Authors: Moctar Sacande and Helen Vautier

Millennium Seed Bank project
Wakehurst Place, Ardingly
West Sussex
RH17 6TN, UK
Phone: +44-1444 894100
Fax: +44-1444 894110
Email: msbsci@kew.org
Website: www.kew.org/msbp

Forest & Landscape Denmark
Hørsholm Kongevej 11
DK-2970 Hørsholm
Denmark
Phone: +45-35281500
Fax: +45-35281517
Email: SL-International@kvl.dk
Website: www.SL.kvl.dk