Securidaca longipedunculata

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Scientific classification
Kingdom: Plantae
(unranked): Angiosperms
(unranked): Eudicots
(unranked): Rosids
Order: Fabales
Family: Polygalaceae
Genus: *Securidaca*
Species: ***S. longipedunculata***
Binomial name
Securidaca longipedunculata Fresen.

Securidaca longipedunculata (**Violet tree**, Afrikaans: *Krinkhout*, Tswana: *Mmaba*, Venda: *Mpesu*) is a species in the Securidaca genus. The Violet Tree is a protected tree in South Africa.

Securidaca longepunculata

Securidaca longepedunculata is a tree that is most commonly found in the tropical and subtropical areas of Africa. It is a relatively small tree, measuring 6 - 12 metres high. There are many different medicinal uses for this tree used all around Africa. It can be used to treat sicknesses as small as headaches or as severe as arthritis. This tree is also commonly used as pesticide against beetles in stored grains. This technique can be very helpful for small-scale subsistence farmers in Africa who are not able to purchase synthetic pesticides.

Description

Securidaca longepedunculata (Violet Tree or Mpesu) is a medium sized tree that grows between 6 – 12 metres high. It has a pale grey, smooth bark with leaves that grow in clusters. The branches are small and have very fine hair. The tree produces flowers that grow in the early part of the South African summer and change from pink to purple. They are sweetly scented and grow in small bunches on a peduncle. The fruit of this tree is round with a wing on one side that can grow up to 40 mm long. It can be seen between April and August.[1]

History

Securidaca longepedunculata grows in the North-West and Limpopo Provinces of South Africa as well as in some tropical and subtropical parts of Africa.[2] It also grows in the tropical savannah, especially in the Miombo and Caesalpinoid woodland.[3] The name is associated with the Latin word securis meaning hatchet, which refers to the shape of the wing on the nut, and longepedunculata makes reference to the long peduncle that holds the flowers.[4] The common name of this tree is Violet Tree and it is also known as Mpesu.[5]

Growing conditions

Securidaca longepedunculata grows in various types of woodlands or arid savannas. Its growth varies in different climates and altitudes with sandy, acidic or rocky soils.[6]

Stress tolerance

This tree suffers from over-harvesting for use in local medicines. Periodic droughts and bushfires are also a hazard for the propagation of this tree.[7]

Common Uses

The use of Securidaca longepedunculata varies immensely. The roots of the tree can be used for treatments to human ailments such as coughs, chest complaints, toothaches, gout, fevers, constipation, diabetes and microbial infections. It also possesses anti-inflammatory properties that help to reduce arthritic pains.[8] Uses of this tree vary across different countries. A combination of both the methanol extract and the methyl salicylate component from the roots of the plant create a poison that is used for multiple purposes. This poison is used on arrows to hunt with in West Africa.[9] In Limpopo, the Vhavenda people use the roots to prevent mental disorders and they believe that this remedy will also protect children from illnesses during breastfeeding. People in Zimbabwe use the roots to treat people who seem to be possessed by evil spirits and it is often used on snake bites.[10] Soap, fishing nets, and baskets can be made with the bark of the tree. This tree is also used to assist some subsistence farmers in maintaining stored grains. The bark and roots of this tree can be grounded up into powder and mixed in with stored grains to create a pesticide against various beetles. This alternative to synthetic pesticides is necessary for small-scale farmers in Africa who may not have the resources or money needed for synthetic pesticides.

Practical Information

Securidaca longepedunculata as a Pesticide The roots of Securidaca longepedunculata can be ground into a fine powder and this powder is used to protect stored grains.[11] Methyl salicylate is a well-known plant stress signal which often has insect repellant properties. In Securidaca longepedunculata, methyl salicylate makes up 90% of the volatile component of the roots, which is very uncommon in many other grains or legume seeds.[12] A mixture of methanol extract and methyl salicylate create a very effective natural pesticide against weevils and other insects in stored grains. Studies done on grains such as corn and cowpea indicated that after 6 days of exposure to Securidaca longepedunculata, the mortality rate of the adult beetles was 100% in an enclosed jar.[13] In addition, when S.longepedunculata powder was applied to grains already infested with weevils, the damage done to the grains was reduced by 65%. The beetles that are most likely to infest stored grains are the S. zeamais (maize weezil), Rhyzopertha dominica, and Prostephanus truncates. Studies suggest that the maize weezil is able to detect the scent of methyl salicylate and tends to avoid it. It is both a repellent for insects as well as a poison, which helps to reduce the number of female eggs in the grains. This type of pesticide use is very efficient and it allows storage of the grains for at least 9 months.</ref>Stevenson, Philip C., Thamara K. Dayarathna, Steven R. Belmain, and Nigel C. Veitch. "Bisdesmosidic Saponins FromRoots: Evaluation of Deterrency and Toxicity to Coleopteran Storage Pests." Journal of Agricultural and Food Chemistry (2009)</ref> This discovery provides some small-scale farmers in Africa with a low cost, natural alternative to synthetic pesticides.[14] In some developing countries, it is difficult for poor farmers

to access good quality and affordable synthetic pesticides; in addition these can harm the environment if they are not properly implemented. Such indigenous practices require further validation.

Constraints to wider adoption

The practice of using Securidaca longepedunculata as a common pesticide for stored grains is not a widespread solution. Although it is very efficient to use this species as a tool to store grains for longer periods of time, there are constraints to wider adoption rates. A very significant problem is scarcity in natural resources.[15] Securidaca longepedunculata is used for various different purposes, and they often involve the roots of the plant. If the root of the plant is always being cut, it is difficult for the plant to be harvested constantly.[16] There is little incentive to invest in a project like this because there is no assurance that the starting material can be reproduced in sufficient quantities. In addition, studies have shown that a specific concentration of the active ingredient, methyl salicylate, is needed for the powder to effectively work as a pesticide.[17] Improved technologies are needed in order to fully cover all the seeds with the powder in order for the repellent to work. Turning over the crops and mixing it by hand can be very labor intensive for the farmer and it doesn't always assure full coverage of the seeds.[18] One solution could be to create an extract by mixing the powder with water. An extract would be useful for maize seeds because the glassy surface of maize prevents the Securidaca longepedunculata powder to adhere to its surface. This will allow the pesticide to be evenly spread out, although more tests and studies need to be done to improve this technique.[19]

Conservation efforts

Securidaca longepedunculata is listed on the National Forest Act of 1998 list of South Africa, and is noted as a protected tree. Royal Botanical Gardens, Kew, has also put this tree under their "Adopt a seed- save a species" campaign. Anyone can go and help purchase an African violet tree in order to protect the species and help local communities in Mali. This initiative is part of the Millennium Seed Bank Partnership.[20]

References

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