Tribulus terrestris

From Wikipedia, the free encyclopedia

Tribulus terrestris is a flowering plant in the family Zygophyllaceae, native to warm temperate and tropical regions of the Old World in southern Europe, southern Asia, throughout Africa, and in northern Australia. It can thrive even in desert climates and poor soil.

Like many weedy species, this plant has many common names. **Puncture Vine**, **Caltrop**, **Yellow Vine**, and **Goathead** are the most widely used; others include automobile-weed, bindy eye, bindii, bullhead, burnut, burra gokhroo, calthrops, cat's head, common dubbeltjie, devil's thorn, devil's weed, doublegee, dubbeltje, gokshura, ground bur-nut, isiHoho, land caltrop, Maltese cross, Mexican sandbur, puncture weed, rose, small caltrops, sticker, tackweed, and Texas sandbur (also *T. micrococcus*).

It is a taprooted herbaceous perennial plant that grows as a summer annual in colder climates. The stems radiate from the crown to a diameter of about 10 cm to over 1 m, often branching. They are usually prostrate, forming flat patches, though they may grow more upwards in shade or among taller plants. The leaves are pinnately compound with leaflets less than a quarter-inch long. The flowers are 4–10 mm wide, with five lemon-yellow petals. A week after each flower blooms, it is followed by a fruit that easily falls apart into four or five single-seeded nutlets. The nutlets or "seeds" are hard and bear two sharp spines, 10 mm long and 4–6 mm broad point-to-point. These nutlets strikingly resemble goats' or bulls' heads; the "horns" are sharp enough to puncture bicycle tires and to cause considerable pain to bare feet.

The Latin name *tribulus* originally meant the caltrop (a spiky weapon), but in Classical times already meant this plant as well.[1]

Cultivation and uses

The plant is widely naturalised in the Americas and also in Australia south of its native range. In some states in the United States, it is considered an invasive species.
It has been reported that Puncture Vine seeds have been used in homicidal weapons in southern Africa; murderers smear them with the poisonous juice of *Acokanthera venenata* and put them where victims are likely to step.[2]

Dietary supplement

Tribulus terrestris has long been used as a tonic and aphrodisiac in Indian ayurveda practice, where it is known by its Sanskrit name, "gokshura".[3] It is now being promoted as a testosterone booster for the purpose of building muscle and increasing sex drive.

Its use for this purpose originated in Eastern Europe in the 1970's. However, it was not until noted strongman Jeffrey Petermann's use that it became popular amongst amateur bodybuilders in North America. Independent studies [4] have suggested that *Tribulus terrestris* extract does increase testosterone levels, though leaving them in the normal range, which is not thought to increase muscle development.

Some have compared the tonic properties of *Tribulus terrestris* to the effects of ginseng, but these occur due to entirely different mechanisms. Claims have been made that it enhances testosterone levels by increasing luteinizing hormone (LH) levels.[5] LH is responsible for "telling" the body to produce testosterone. One interesting fact is that extended use of anabolic steroids reduces levels of LH, thus reducing and sometimes shutting down the body's production of testosterone.[6]

It is also claimed that *Tribulus terrestris* increases testosterone by increasing gonadotropin-releasing hormone[7] (GnRH) which in turn stimulates the production of LH and follicle-stimulating hormone (FSH). Testosterone,

besides its role in muscle-building and raising fertility and libido, is also known to have a positive effect on bone marrow activity (for red blood cell production) and the immune system.[citation needed]

The active chemical in *T. terrestris* is proven to be protodioscin (PTN),[10] a cousin to DHEA. In a study with mice, *Tribulus* was shown to enhance mounting activity and erection better than testosterone cypionate.[citation needed] This however, isn't as convincing as one might think. Although an OTC supplement outpacing a pharmaceutical is big news, testosterone cypionate is a synthetic ester of testosterone engineered for its longer activity. To be effective, its level must build up in the system of the animal using it. This process usually takes 2–3 weeks.[citation needed]

No significant adverse effects have been reported from supplementation with *Tribulus terrestris*. However, some users report an upset stomach, which can usually be counteracted by taking it with food.[4]

Eradication

As this is a non-indigenous species eradication methods are often sought after. There are both biological and herbicidal solutions to the probelm but neither of them provide a quick long lasting solution because *T. terrestris* seeds remain viable for up to 3-7 years on average.

Physical

In smaller areas puncturevine is best controlled with manual removal using a hoe to cut the plant off at its taproot. This requires monitoring the area and removing the weed through out the preseeding time of late pring and early summer. This will greatly reduce the prevalence of the weed the following year. Mowing is not an effective method of eardication because the plant grows flat against the ground.
Another avenue of physical eradication is to crowd out the opportunistic weed by providing good competition from favorable plants. Aerating compacted sites and planting competitive desirable plants including broad leaf grasses such as St Augustine can reduce the impact of puncturevine by reducing resources available to the weed.

Chemical

Chemical control is generally recommended for home control of Puncturevine. There are few preemergent herbicides that are effective. Products containing oryzalin, benefin, or trifluralin will provide partial control of germinating seeds. These must be applied prior to germination (late winter to midspring).
After plants have emerged from the soil (postemergent), products containing 2,4-D, glyphosate, and dicamba are effective on puncturevine. Like most postemergents they ar emore effectively maintained when caught small and young. Dicamba and 2,4-D will cause harm to most broadleaf plants so take care in avoiding over application. They can be applied to lawns without injuring the desired grass. Glyphosate will kill or injure most plants so it should only be used as spot treatments or on solid stands of the weed.

Biological

Two weevils, Microlarinus lareynii and M. lypriformis, native to India, France, and Italy, were introduced into the United States as biocontrol agents in 1961. Both species of weevils are available for purchase from biological suppliers but purchase and release is not often recommended because weevils collected from other areas may not survive at your location.
Microlarinus lareynii is a seed weevil that deposits its eggs in the young burr or flower bud and the larvae feed on and destroy the seeds before they pupate, emerge, disperse, and start the cycle over again. Life cysle tme is 19 to 24 days. Microlarinus lypriformis is a stem weevil that has a similar life cycle excepting the locaion of the eggs which include the undersides of stems, branches, and the root crown. The larvae tunnel in the pith where they feed and pupate. Adults of both species overwinter in plant debris. Although the stem weevil is slightly more effective than the seed weevil when each is used alone, the weevils are most effective if used together and the puncturevine is moisture-stressed.

References

1. ^ Charlton T. Lewis, Charles Short, *A Latin Dictionary*
2. ^ BoDD (Botanical Dermatology Database) - ZYGOPHYLLACEAE, accessed April 15, 2007
3. ^ Gokshura, accessed May 17, 2006
4. ^ [a] [b] [c] Tribulus Terrestris - Supplements from Supplement Watch, accessed May 17, 2006
5. ^ Tribulus Terrestris Facts from bodybuildingforyou.com, accessed May 17, 2006
6. ^ Ask A Scientist - Anabolic Steroids from Howard Hughes Medical Institute, accessed May 17, 2006
7. ^ Natural Testosterone Therapy with gonadotropic adaptogen compound containing Tribulus terrestris
8. ^ V. K. Neychev and V. I. Mitev (2005). "The aphrodisiac herb *Tribulus terrestris* does not influence the androgen production in young men". *Journal of Ethnopharmacology* **101** (1–3): 319–323.
9. ^ G. A. Brown et al. (2000). "Effects of anabolic precursors on serum testosterone concentrations and adaptations to resistance training in young men". *International Journal of Sport Nutrition and Exercise Metabolism* **10** (3): 340–359.
10. ^ K. Gauthaman, A. P. Ganesan, and R. N. Prasad (2003). "Sexual effects of puncturevine (*Tribulus terrestris*) extract (protodioscin): an evaluation using a rat model". *Journal of Alternative and Complementary Medicine* **9** (2): 257–265.

External links

- Germplasm Resources Information Network: *Tribulus terrestris*
- Flora Europaea: native distribution in Europe
- Page on *T. terrestris* at the Global Compendium of Weeds
- Page from the U.S. Department of Agriculture's PLANTS database
- Abstract of Brown et al. (2000) at PubMed
- Abstract of Gauthaman, Aidakan, and Prasad (2003) at PubMed
- Abstract of Neychev and Mitev (2005) at PubMed