

NOTES ON ECONOMIC PLANTS

Local treatment of human botfly myiasis in Belize. – The human botfly (*Dermatobia hominis*) is found from Mexico to northern Chile and Argentina (1). The larva of this forest-dwelling fly develops in the skin of birds and mammals, including man. The female botfly captures and lays her eggs on the legs of a dipteran, usually a mosquito, although at least 48 species of dipterans and one tick are confirmed vectors (1, 2). Upon contact with the host, eggs immediately hatch and larvae penetrate the skin. Pre-existing lesions are not required for entry into the host (1, 3). The developing maggots form furuncular lesions with a central respiratory orifice. A pair of spiracles located on the caudal extremity remain in this orifice allowing the maggot to breathe (1, 4). Transverse rows of epidermal spines anchor the maggot within the muscle (1). Maggots do not wander and development to pupal stage requires about six weeks, although infections up to three months have been reported (5). At maturity maggots measure up to 25 mm long and 7 mm in diameter (3). Pupae exit the host and pupation is completed in the soil (1).

Human botfly myiasis is ubiquitous throughout the neotropics (3, 4, 6, 7) and is characterized by intense throbbing pain accompanied by persistent serous discharge (4, 5). Dermal myiasis is most common, but cases of nasal, ocular, and palpebral myiasis have been reported, and larval penetration of the brain has proven lethal in young children (4, 6, 7). Bacterial superinfection and tetanus often complicate botfly myiasis (8).

Myiasis is cured by larvae removal. Maggots can be surgically excised, but this option is often not available to rural inhabitants (1). Maggots may also be expressed by digital pressure to the lesion, but anchoring epidermal spines make this difficult and rupturing the larvae during the process can result in a potentially lethal foreign body reaction (5). The most common treatment is blocking the respiratory orifice with an occlusive dressing. Fingernail polish, adhesive tape, and make-up cream have been used, but these substances may asphyxiate the maggot without causing it to migrate out of the skin (8). Pork fat is reportedly a more satisfactory dressing,

and maggots migrate into the fat from 3 to 24 hours after application (4, 5, 8).

Botfly myiasis is common among the rural inhabitants of Belize, especially farmers, hunters, chicle-gatherers, and others who spend considerable time in the forest. A widespread and highly effective local treatment for human botfly myiasis utilizes the sap of *Stemmadenia donnell-smithii* (Rose) Woodson and *Thevetia ahouai* (L.) A. DC, both in the family Apocynaceae. These small trees are common in wet thickets and savannas throughout the region and are known locally as "huevos de burro," "huevos de caballo," and "cojon de perro" because of the resemblance of the paired fruits to animal testicles.

Both JCM and SOP have successfully treated personal cases of botfly myiasis, and observed treatment in others using this remedy. Treatment is accomplished by obtaining sap from freshly cut twigs and branches. Sap is forced into the lesion via the respiratory orifice and the orifice is occluded. A small piece of paper may not be placed over the sap. This remedy is relatively fast-acting and SOP has removed maggots within one hour of application. Removing the sap may pull the maggot from the lesion, otherwise it is easily expressed by applying pressure. According to local lore, the sap acts to suffocate and kill the maggot. However our observations indicate maggots are still alive when removed. The sap appears to anesthetize the maggot causing a relaxation of epidermal spines, thus facilitating manual expulsion from the lesion. Maggots must be removed soon after treatment as death of the maggot will ensue and a rapid healing of the respiratory orifice will result in abscess formation.

The milky, latex-like sap of the Apocynaceae is known to contain a number of toxic compounds including cardiac glycosides and various alkaloids (9). Medicinal uses of *Thevetia ahouai* sap have been reported elsewhere in the region. Among the Paya of Honduras it is used as a topical anesthetic for dental pain (10), and in the Yucatan region of Mexico as an anti-inflammatory, and for treating toothaches, skin infections, and open sores (11).

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Literature Cited. (1) Schmidt, G. D., L. S. Roberts, and J. Janovy, Jr. 1996. Foundations of parasitology. William C. Brown Publishers, Dubuque, Iowa. (2) Floch, H., and P. Tauran. 1954. Les vecteurs de la myiase furunculeuse en Guyane Francaise. Bulletin de la Societe de Pathologie Exotique 47:652-656. (3) Curran, C. H. 1939. The human botfly. Natural History 44:45-48. (4) Ruch, D. M. 1967. Botfly myiasis. Archives Dermatology 96:677-680. (5) Sauder, D. N., R. P. Hall III, and C. E. Wurster. 1981. Dermal myiasis: the porcine lipid cure. Archives Dermatology 117:681-682. (6) Dunn, L. H. 1934. Prevalence and importance of the tropical warble fly

Dermatobia hominis Linn. in Panama. Journal Parasitology 20:219-226. (7) Rossi, M. A., and S. Zucoloto. 1973. Fatal cerebral myiasis caused by the tropical warble fly *Dermatobia hominis*. American Journal Tropical Medicine and Hygiene 22:267-269. (8) Brewer, T. E., M. E. Wilson, E. Gonzalez, and D. Felenstein. 1993. Bacon therapy and furuncular myiasis. Journal American Medical Association 270:2087-2088. (9) Cronquist, A. 1981. An integrated system of classification of flowering plants. Columbia University Press, New York. (10) Lentz, D. L. 1993. Medicinal and other economic plants of the Paya of Honduras. Economic Botany 47:358-370. (11) Pulido-Salas, T., and L. Serralata-Peraza. 1993. Lista anotada de las plantas medicinales de uso actual en el estado de Quintana Roo, Mexico. CICRO Press, Chetumal, Mexico.

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