Indigenous wisdom for the use of Giant weed in disease and pest management

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The Giant weed (Calotropis procera R Br, family Asclepiadaceae) widely distributed in West Bengal, Rajasthan, UP, Punjab, Haryana and Madhya Pradesh is naturalized in the East and West Indies and Sri Lanka. Calotropis sp. is being used indigenously in the control of termite, paddy and ginger pests, stem and root borer, mustard saw fly, red hairy caterpillar, galo disease, bud necrosis disease, blight disease, various diseases in animals and poultry. Various microorganisms related to human beings are discussed.

Key words: Indigenous wisdom, Giant weed, Indigenous pest management, Traditional pest management

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Environmental pollution has imposed serious threat globally mainly due to the growing utilization of agrochemicals including pesticides. With global perspectives of environmental protection and food security, indigenous wisdom is getting worldwide importance for sustainable eco-friendly agriculture production system. To combat the challenges of today’s food production, healthcare and nutritional security, biological pesticides including plant-based pesticides can play a greater role. Insect pests, diseases and weeds inflict enormous loss to the potential agriculture production. Anecdotal evidences also indicate rise in the loss, despite increasing use of chemical pesticides. At the same time, there is a rising public concerns about the potential adverse effects of chemical pesticides on the human health, environment and biodiversity. These negative externalities, though, cannot be eliminated altogether but their intensity can be minimized through development, dissemination and promotion of alternative technologies such as plant-based pesticides. India has a vast flora and fauna that have potential for developing in to commercial technologies. Calotropis procera belonging to family Asclepiadaceae is known as Gigantic Swallow Wort, Rubber bush, apple of Sodom, Mudar, Madar, kings crown, rooste tree in English; Ark, Mandar, Alark, Madar, Shookphal, etc. in Sanskrit; Aak, Madar, Akoa, Aakvan and Akha, etc in Hindi; Rui and Aakda in Marathi; Aakdo in Gujarati and Aakand in Bengali. It is a shrub, about 4 m in height, exudes copious milky sap when cut or broken. Leaves opposite; flowers waxy violet or white; petals 5, purple tipped inside and with a central purplish crown; fruits gray green, 8-12 cm long, containing numerous seeds with tufts of long silky hairs at one end. It contains Calotropin, an active poison of the digitalis type. Latex contains traces of glutalione and a proteoclastic enzyme. Root bark contains β-amyrin, 2 – isomeric crystalline alcohol, giganteol and iso-giganteol. Flowers contain esters of α-and β-calotropeols and β-amyrin.

Indigenous practices making use of Calotropis plant have been described under the following Heads:

1 Management of the pests, nematodes and crop diseases
2 Enhancement of crop yield, and
3 Animal husbandry

1 Management of the pests, nematodes and crop diseases

- Calotropis procera leaf extract used @ 15% and 20% solution for the dipping of sugarcane sets was found effective in controlling termite (Odontotermes obesus Rambur).
- Sprinkling of 2.0 % solution of plant extract in soil, just before the setts were covered with soil was found equally effective against the termite in sugarcane. Plant material soaked in water for at least 24 hrs, filtered, and poured on termite-infested soil was found to be effective. It is used by the farmers (25 – 30%) in Gujarat.
• Approximately 5 kg each of *Calotropis procera* and Keemp (*Leptadenia pyrotechnica*) twigs are cut into small pieces and put into an earthen pot. About 1 kg of salt and 10 l urine are added to it. This container is closed air tight and kept in manure pit for 15 – 20 days. The suspension is filtered through cotton cloth and filtrate is applied as an insecticide along with irrigation water. Approximately 10 l solution is sufficient for 1 ha to control the termites. This practice is in vogue in Rajasthan 3.

• *Calotropis procera* leaves are immersed in water for two days, diluted, filtered and is then applied at the place of termite attack. This method is quite cost effective and is in vogue in Pondicherry and Makaribili village of Nawapada, Orissa 4, 5.

• In Rajasthan, farmers keep the plant twigs along with about 50 gm urea and 1 l water in earthen pot, and sealed airtight by plastering its mouth with clay soil. This container is kept in a manure pit for 2 months, the twigs get completely decomposed, and the extract is filtered and used for seed treatment of wheat, barley and chickpea. Termites do not affect treated crops. The same extract is also used in ornamental plants without affecting the earthworm adversely 6.

• The latex of *Calotropis gigantea* R Br ex Ait, when diluted with 15 parts of water and sprayed on cotton crops, effectively controls caterpillars within three days. The new flesh coming after the treatment is also free from the infestation of caterpillars. This is in practice of Bhavnagar area of Gujarat 11.

• In Surendranagar area of Gujarat, farmers spread the leaves of the standing crop, which is infested by *Katara* (army worm). Insects gathered on the broadcast leaves are collected next day. Simultaneously, fresh leaves are replaced there. The collected leaves with larvae are destroyed 10.

• Farmers of Pudupatti, Tamil Nadu use the plant to control the brown plant hopper in the affected fields. Leaves are kept in the soil deep to control brown plant hopper in nurseries as well as in rice fields.

• Farmers of Medak and Nalgonda districts of Andhra Pradesh, spread twigs on field boundaries to control red hairy caterpillar in groundnut fields. The alkaloid acts as a repellent 12. Twigs are also used as a trap in castor, sesame and groundnut in rainy season attracts red hairy caterpillar due to smell of leaf latex. The larvae are collected and burnt. It is more economical and easily accessible than the use of light or pheromone traps 13.

• In Mehsana area of Gujarat, farmers spread the leaves in the standing crop, which is infested by *Katara* (army worm). Insects gathered on the broadcast leaves are collected next day. Simultaneously, fresh leaves are replaced there. The collected leaves with larvae are destroyed 10.

• *Galo*, a disease of sugarcane characterized by deposition of sticky droplets, semi-liquid honey like dew on the leaves and stems, may be controlled by leaf extract. Long before winter sets in, the farmers collect twigs, soak them in a tank filled with water and allow them to decay for months. This extract is then sprayed on the crops. This treatment cures the disease within 2-3 days. No side effect has been noticed, however, the cane should be washed before consumption. Even though the practice is laborious, about 30-40% of the farmers in Amreli area of Gujarat have been using this method for the last 8 – 10 years 14.

• In Karnataka, *Calotropis procera* branches are placed at the water inlet of paddy fields to control insect pests because of the alkaloid present in latex, which acts as a repellant 9. Stem and root borers are also controlled by this method. Whole plant leaving the root part is ground and is placed at the irrigation channel. The plant extract flows with water into the field and helps in controlling stem and root borers.
water is sprayed at 8–10 days regular intervals to prevent blight disease\textsuperscript{15}.

- To save ginger (\textit{Zingiber officinale} Rosc.) from the attack of insect pests \textit{Calotropis} sp. is planted randomly in the fields. The smell emanating from the plant acts as repellent for the insect pests. This is practiced in Sabarkantha area of Gujarat\textsuperscript{16}.
- Spraying of aqueous leaf extract @ 1\% within 40 days of germination (two sprays) reduced the bud necrosis disease in groundnut\textsuperscript{17}.
- Application of leaf powder @ 50 kg/ha in mustard was found effective to control mustard saw fly (\textit{Athalia proxima}). Moreover, soil application of leaf powder (@ 100 kg/ha) reduced the root knot nematode up to considerable extent in pigeon pea\textsuperscript{18}.

2 \textbf{Enhancement of crop yield}

Some of the practices adopted by the village folks to enhance growth and productivity of certain crop plants are as follows:

- For increasing the yield of areca nut and coconut, some farmers dig soil around the palms and bury 25-45 kg plant pieces in to soil in circular manner.
- Farmers believe that any plant species having natural ooze or gum secretion applied to areca nut or coconut palm during monsoon season results in production of more nuts\textsuperscript{19}.

3 \textbf{Animal husbandry}

- Leaf decoction is applied to the skin of camels, donkeys and horses often suffering from eczema. This is done once or even twice a day. The treatment gives relief to the animal within a week\textsuperscript{20}.
- Two kg stem bark or leaves boiled, after cooling made into paste is smeared on the swollen region of the animal body to reduce swelling in cattle. This remedy is so effective that if the paste is smeared just once, the swelling recedes within 2-3 days.
- Leaf juice is used to flow out foreign material from the eye of the animals. Due to pungency of the juice animals passes too much water from the eyes and foreign material comes out with this water. Farmers of Solapur and Ahmednagar in Maharashtra are using this practice. Farmers are also using leaf juice to cure any eye disease of animals.
- \textit{Calotropis} sp. is used to control worm infestation on the tail of animals.
- Sometimes a kind of parasite attacks the tail gets necrosed necessitating amputation of the tail. Latex is used to expel parasite from the tail. The farmers in Sunderbani area of Rajouri district of Jammu and Kashmir are using this practice\textsuperscript{21}.
- Leaves are also used to control the afara (flatulence / tympany) disease in animals. About 5–6 leaves are fed to the diseased animal thrice a day by putting in bread. The practice is continued for 4–5 days to get complete relief. This is in vogue in Suhagi village of Jabalpur district, Madhya Pradesh\textsuperscript{22}.
- Fried leaves are used in the control of cold fever in animals. 300-400 gm leaves are fried in 100 ml mustard oil and pasted on the backbone of the animal twice a day for about 3–4 days. About 70–80\% of the disease is cured. The people in Sonapur village in Azamgarh district of Uttar Pradesh have been practicing it\textsuperscript{23}.
- The villagers of Gopalpur, Orissa apply the latex on the wounds of the afflicted animals 2-3 times on alternate days, for healing the wounds\textsuperscript{24}.
- The farmers of Marangapallam village of Thanjavur district, Tamil Nadu also use leaves to control ticks in poultry birds\textsuperscript{25}.
- Root bark is used for the treatment of elephantiasis, leprosy, chronic eczema, diarrhoea and dysentery\textsuperscript{26}.

\textbf{Conclusion}

In the light of the various indigenous practices adapted over the years by our village folks in controlling the pests problems, there is an urgent need to catalogue and disseminate eco-friendly plant pesticide based protection technologies, towards healthy life of the man and his dependants.

\textbf{References}


