



REVIEW ARTICLE

Ecological and Medicinal Value of Some Milkweed Plants

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ABSTRACT

Some milkweed plant species threatened due to habitat destruction, urbanization, and forest fire, environment changing and biotic factors. Birds, Reptiles, Butterflies, and other insects are dependent on milkweed plants. Butterflies, moths, bees, and wasps and more visit milkweeds for pollen and/or nectar. These multi-species relationships are all part of the milkweed ecosystem. The present study, based on ecological and medicinal value of some milkweed plants in Uttar Pradesh, Haryana and Madhya Pradesh. The ecological and medicinal studies were carried out between March 2011 and July 2014. This study recorded 7 milkweed species included *Calotropis gigantea*, *Calotropis procera*, *Leptadenia pyrotechnica*, *Pergularia daemia*, *Asclepias incarnate*, *Asclepias curassavica*, *Oxystelma esculentum* belongs to family *Asclepiadaceae* and milkweed plants associated 13 species included the sunbird (*Cinnyris asiaticus*) family Nectarinidae, carpenter bees (*Xylocopa violacea*, *Xylocopa aestuans*, *Xylocopa caerulea*) family Apidae, monarch butterfly (*Danaus plexippus*) family Nymphalidae, monarch caterpillar larva, honey bee (*Apis dorsata*) family Apidae, black ant (*Camponotus* species) family Formicidae, girgit (*Calotes versicolor*) family Chamaeleonidae, spider (*Oxyopes shweta*) family Oxyopidae, boxelder bug (*Boisea trivittata*) family Rhopalidae, milkweed beetle (*Tetraopes tetrophthalmus*), family Ceranbycidae, mantis family Mantidae, Contact by local people and traditional vaidhya, having experience based on herbal drugs. These plants were collected in Department of Botan It is concluded that the aim of the present study is to spread awareness towards the conservation of the milkweeds in India. The study will be benefited to waste soil improvement, biodiversity conservation and mankind.

KEYWORDS

Milkweeds, Birds, Monarch butterfly, Xylocopa, Medicinal value, Conservation

INTRODUCTION

Most milkweeds species are largely self-incompatible (Wyatt & Broyles 1994). To produce fruits and seeds, self – incompatible species depend on insects to transfer pollen between unrelated plants. Milkweed flowers have a unique structure and are pollinated in a

more specific way than most other insect-visited flowers. Large bees, wasps, and butterflies are considered to be the most important pollinators of various milkweed species (Betz et al. 1994). Honey bee (*apis mellifera*) is a significant pollinator of several milkweed species (Willson & Bertin 1979; Betz et al. 1994). Milkweeds provide food or shelter for a diversity of other insects. Likewise, there are species that consume milkweed leaves or seeds, like large milkweed bugs (*Oncopeltus fasciatus*), and tussock moths (family

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Lymantriidae). Predators, such as crab spiders (family *Thomisidae*) and mantises (order *Mantodea*), prey on the many insect species that frequent and depend upon milkweed). Native Americans earliest uses of milkweed included weaving cloth from milkweed stem fibers and using the fibers to make cords and ropes (Stevens 2000) they also had numerous medicinal uses for the plants, including treating ringworm and bee stings with milkweed sap and taking infusions of the roots to cure coughs or treat venereal disease (Stevens 2000). Traditionally the plant *P.daemia* is used as anthelmintic, laxative, antipyretic and expectorant, also used to treat infantile diarrhoea and malarial intermittent fevers (Kirtikar KR Basu BD. 1999; Anonymous. 1995). Latex of this plant used for toothache (Hebbar SS et al. 2004). The traditional folk healers use the milky sap or latex of *C. procera* for preparation of different drugs and ailments mainly for treatment of boils, infected wounds and rashed skin (Khare CP. 2007). The plants of family Asclepiadaceae remains distributed from south East Asia, India, Madagascar, Tropical Arabia, Canary Island, Africa except Mediterranean region, blew Guinea and north Australia (Bruyns, 2003; Dyer, 1983). The family Asclepiadaceae was previously ranked as family and now it is treated as a subfamily of Apocynaceae. This view was also upheld by the Angiosperm Phylogeny Group (APG 2003, 2009). It is comprised of approximate 130 genera and 2000 species tropical as well as subtropical, mostly shrubs, often twining or perennial herbs (Indhumathi and Kalvimoorthi, 2010). The Fresh leaves are used in treatment of Rheumatoid, Arthritis and Healing of wounds (Patil *et al.*, 2009). The pungent latex extracted from the leaf and flowers of *C. procera* is processed and used in the commercial preparation of eye tonic (Vohra, 2004; Henrich *et al.*, 2004; Gurib-Fakim, 2005; Bruneton, 1999). This present review enumerates the morphology and ethno pharmacology utilization of *C. procera* and *C. gigantea* for the treatment of various human ailments. This plant has been known to possess antibacterial activity, anti-inflammatory activity, schizontocidal activity,

anti larvicidal activity, antioxidant activity, skin disease, jaundice, leucoderma, eczema, ulcer, piles, dysentery, dropsy, ring worm, removing thorn from body, elephantiasis and leprosy and other miscellaneous activities It was also used in making huts and as camel food *Leptadenia pyrotechnica* In the Sahel a seed maceration is used as eye lotion and eye bath. The plant sap is rubbed on the skin to treat smallpox and dermatitis. An infusion of the aerial parts is taken as a diuretic to treat kidney disorders, kidney stones and cough. Kheep (*Leptadenia pyrotechnica*) is a widely distributed shrub in western Rajasthan. It is traditionally used as food and medicine. (Singh et al., 2007). The present study, based on ecological and medicinal value of some milkweed plants in Uttar Pradesh, Haryana and Madhya Pradesh.

MATERIAL AND METHOD

Ecological and medicinal value of milkweeds were randomly visual observations, milkweed species were also photo-documented by Sony DSC H X 1 during the study period March 2011 to July 2014 in Meerut, M. M. college Modi Nagar, Uttar Pradesh, Bahal, Haryana and Pachmarhi, Madhya Pradesh. Species identity, taxonomy and nomenclature were confirmed with the help of the books by H. Santapau and A N. Henry (1972), Salim Ali (2008).

RESULTS

Regional studies examining milkweed pollination found over two dozen insect species using milkweeds; and results indicate that honey bees, bumble bees, other large bees, large wasps, and larger butterflies were the most important milkweed pollinators (Borders, Shepherd 2011). The survey data were recorded and tabulated in observation table no. 1 with their botanical and local names, used, and (birds, insects, and reptiles) 13 species, belonging to different families were found associated with the *Calotropis gigantea*, *Calotropis procera*, *Leptadenia pyrotechnica*, *Pergularia daemia*, *Asclepias incarnate*, *Asclepias curassavica*, *Oxystelma esculentum* plants from different localities of the Uttar Pradesh, Haryana, Madhya Pradesh. The table

number 1 and photographs no 1-24 shows the name, of insects. **Milkweed plants significant**

role for conservation of birds, monarch butterfly, other insects and reptiles.

Table 1

Sr No.	Botanical name/ Family	Local name	Medicinal Uses	Ecological uses
1.	<i>Calotropis gigantea</i> [Asclepiadaceae]	Aak	Epilepsy, Eczema, Expectorant, Fever, Leprosy, Migraine.	sunbird (<i>Cinnyris asiaticus</i>) family Nectarinidae , carpenter bees (<i>Xylocopa violacea</i> , <i>Xylocopa aestuans</i> , <i>Xylocopa caerulea</i>) family Apidae, monarch butterfly (<i>Danaus plexippus</i>) family Nymphalidae, monarch caterpillar larva, honey bee (<i>Apis dorsata</i>) family Apidae, black ant (<i>Camponotus</i> species) family Formicidae, gigit (<i>Calotes versicolor</i>) family Chamaeleonidae, spider (<i>Oxyopes shweta</i>) family Oxyopidae, boxelder bug (<i>Boisea trivittata</i>) family Rhopalidae, milkweed beetle (<i>Tetraopes tetrophthalmus</i>), family Ceranbycidae, mantis family mantidae
2.	<i>Calotropis procera</i> [Asclepiadaceae]	Aak	Leaves are in asthma; Latex used for ringworm, guinea worm blisters, scorpion stings, venereal sores & ophthalmic disorders	sunbird (<i>Cinnyris asiaticus</i>) family Nectarinidae, carpenter bees (<i>Xylocopa violacea</i> , <i>Xylocopa aestuans</i> , <i>Xylocopa caerulea</i>) family Apidae,

				<p>monarch butterfly (<i>Danaus plexippus</i>) family Nymphalidae, monarch caterpillar larva, honey bee (<i>Apis dorsata</i>) family Apidae, black ant (<i>Camponotus</i> species) family Formicidae, girgit (<i>Calotes versicolor</i>) family Chamaeleonidae, spider (<i>Oxyopes shweta</i>) family Oxyopidae, boxelder bug (<i>Boisea trivittata</i>) family Rhopalidae, milkweed beetle (<i>Tetraopes tetrophthalmus</i>), family Ceranbycidae, mantis family Mantidae</p>
3.	<i>Leptadenia pyrotechnica</i> [Asclepiadaceae]	Kheep	used as eye lotion and eye bath. The plant sap is rubbed on the skin to treat smallpox and dermatitis. An infusion of the aerial parts is taken as a diuretic to treat kidney disorders, kidney stones and cough.	black ant (<i>Camponotus</i> species) family Formicidae,
4.	<i>Pergularia daemia</i> , [Asclepiadaceae]	Utaran	Leaves are used in spleen, liver enlargement and toothache	black ant (<i>Camponotus</i> species) family Formicidae
5.	<i>Asclepias incarnata</i> [Asclepiadaceae]	Swamp milkweed	Rheumatism, cold and inflammation of the lungs.	black ant (<i>Camponotus</i> species) family Formicidae

6.	<i>Asclepias curassavica</i> [Asclepiadaceae]	Blood milkweed	Root used to ringworm and stop bleeding.	black ant (<i>Camponotus</i> species) family Formicidae
7.	<i>Oxystelma esculentum</i> [Asclepiadaceae]	Dudhialata	Juice is used in muscle pain, gonorrhoea, cough.	monarch butterfly (<i>Danaus plexippus</i>) family Nymphalidae



1. View of *Cinnyris asiaticus* on *Calotropis gigantea*



2. View of *Xylocopa violacea* on *Calotropis gigantea* with pollinia attached to every leg



3. View of *Cinnyris asiaticus* on *Calotropis gigantea*



4. View of *Mantis* sp. on leaf *Calotropis gigantea*



5. View of *Calotropis gigantea* grown on uncultivated waste land



6. View of Mature pods with floss fibers of *Calotropis gigantea*



7. View of *Danaus plexippus* on *Calotropis procera* with numerous pollinia on its front leg



8. View of Caterpillar larva feeding on leaf of *Calotropis procera*



9. View of *Xylocopa caerulea* on *Calotropis procera*



10. View of *Camponotus* sp. on *Calotropis procera*



11. View of *Apis dorsata* on *Calotropis procera* attached to every leg



12. View of Chameleon on *Calotropis procera*



13. View of *Tetraopes tetrophthalmus* on immature fruit of *Calotropis procera*



14. View of *Xylocopa aesteans* on *Calotropis procera*



15. View of *Oxyopes shweta* on *Calotropis procera*



16. View of *Boisea trivittata* on fruit of *Calotropis procera*



17. View of *Asclepias incarnata*



18. View of *Camponotus* sp. on *Asclepias curassavica*



19. View of *Leptadenia pyrotechnica* blooming



20. View of Immature pods and flowers of *Leptadenia pyrotechnica*



21. View of *Danaus plexipus* on *Oxistelma esculentum*



22. View of Mature pod with floss fibers of *Oxistelma esculentum*



23. View of Flowers of *Pergularia daemia*



24. View of Mature pods of *Pergularia daemia*

REFERENCES

1. Angiosperm Phylogeny Group, T. (2003). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG II. *Botanical Journal of the Linnean Society*, 141(4), 399-436.
2. Angiosperm Phylogeny Group. (2009). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. *Botanical journal of the Linnean Society*, 161(2), 105-121.
3. Anonymous. 1995 Indian Medicinal Plants (a compendium of 500 species), Vol. IV. Hyderabad: Orient Longman Ltd.; p. 386 - 389.
4. Struven, R. D., Wall, J. E., & Heitler, F. B. (1994). Insect pollinators of 12 milkweed (Asclepias) species. In *Proceedings of the thirteenth North American Prairie Conference. Department of Parks and Recreation, Windsor, Ontario, Canada (pp. 45-60)*.
5. Borders, B., & Shepherd, M. (2011). Milkweeds: Not Just for Monarchs. *Wings: Essays on Invertebrate Conservation*, 14-18. Retrieved September 19, 2016.
6. Bruce TBF. 1998 & 2000 Personal communications phytotherapist. Accra: Ghana
7. Bruneton, J. 1999. *Pharmacognosy, Phytochemistry and Medicinal Plants*. Intercept. Ltd. England, U.K.
8. Bruyns, P. V. (2003). Three new succulent species of Apocynaceae (Asclepiadoideae) from southern Africa. *Kew Bulletin*, 427-435.
9. Gurib-Fakim, A. (2006). Medicinal plants: traditions of yesterday and drugs of tomorrow. *Molecular aspects of Medicine*, 27(1), 1-93.
10. H. Santapau and A.N. Henry 1972. A Dictionary of the flowering plants in India CSIR New Delhi.
11. Hebbar, S. S., Harsha, V. H., Shripathi, V., & Hegde, G. R. (2004). Ethnomedicine of Dharwad district in Karnataka, India—plants used in oral health care. *Journal of Ethnopharmacology*, 94(2-3), 261-266.
12. Heinrich, M., Barnes, J., Prieto-Garcia, J., Gibbons, S., & Williamson, E. M. (2017). *Fundamentals of Pharmacognosy and Phytotherapy E-Book*. Elsevier Health Sciences.
13. Indhumathi D. and Kalvimoorthi, (2010). Pharmacognostic preliminary phytochemical and anti-microbial activity on the whole plant of *Sarcostemma secomone* (L.) Bennet. *International Journal of Pharmaceutical Science Review and Research*, 1(2), 49-55.
14. Khare, C. P. (2008). *Indian medicinal plants: an illustrated dictionary*. Springer Science & Business Media.
15. Kirtikar KR, Basu BD. 1999 Indian Medicinal Plants, Vol.III. Dehardun: International Book Distributors; 1616 – 1617.
16. Patil, S. B., Naikwade, N. S., Kondawar, M. S., Magdum, C. S., & Awale, V. B. (2009). Traditional uses of plants for wound healing in the Sangli district, Maharashtra. *International Journal of PharmTech Research*, 1(3), 876-878.
17. Salim Ali 2008. *About Indian Birds Wisdom tree*, New Delhi.
18. Singh, J. P., Rathore, V. S., & Beniwal, R. K. (2007). Kheep (*Leptadenia pyrotechnica*): potential rangeland shrub of Western Rajasthan, India. *Indian Journal of Plant Genetic Resources*, 20(3), 199-203.
19. Stevens, M. 2000a. "Plant guide for showy milkweed (*Asclepias tuberosa*)." Greensboro, NC: U.S. Department of Agriculture-Natural Resources Conservation Service, National Plant Data Center. Available at <http://goo.gl/0wwCT7>. (Accessed 12 May, 2014).

20. Stevens, M. 2001. "Plant guide for butterfly milkweed (*Asclepias tuberosa*)." Greensboro, NC: U.S. Department of Agriculture-Natural Resources Conservation Service, National Plant Data Center. Available at <http://goo.gl/qeNjEZ>. (Accessed 12 May, 2014)
21. Willson, M. F., & Bertin, R. I. (1979). Flower-visitors, nectar production, and inflorescence size of *Asclepias syriaca*. *Canadian Journal of Botany*, 57(12), 1380-1388.
22. Woodson, R. E. (1954). The North American species of *Asclepias* L. *Annals of the Missouri Botanical Garden*, 41(1), 1-211.
23. Wyatt, R., & Broyles, S. B. (1994). Ecology and evolution of reproduction in milkweeds. *Annual Review of Ecology and Systematics*, 25(1), 423-441.

