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# Mosquito Larvicidal Effects of 33 Plants Aqueous Extracts of 14 Different Plants Against Larva of Culex Mosquito

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***Abstract:*** ***In this study, the mosquito larvicidal activity of 33 plant's aqueous extracts of 14 different plants were studied against the 4th instar larva of Culex quinquefasciatus mosquito. Different concentration of these plant aqueous extracts for different time duration was assessed on C. quinquefasciatus but the larvae showed negligible effects. These observation suggest that a very negligible better to say no larvicidal activity seen by these plant's aqueous extract against Culex quinquefasciatus.***
***Keywords: Mosquito larvicidal effect, Culex quinquefasciatus, Plant's aqueous extract, 4th instar mosquito, Mosquito Larva***

## I. INTRODUCTION

Every plant that we see around us is full of one or the other quality and each one has some or the other important medicinal properties. In addition to providing us with oxygen, trees and plants are essential to the meaningful growth of the entire planet and hence, their importance in our life is inexhaustible.

The 14 different plants chosen was *Alternanthera philoxeroides, Kalanchoe pinnata, Opuntia elatior, Centratherum punctatum, Colocasia esculenta, Cordyline fruticose, Cyperus eragrostis, Duranta, Euphorbia tithymeloides, Ixora coccinea, Jatropha gossypiifolia, Martynia annua, Persicaria longiseta, Stachyterpheta indica* from which different parts 33 aqueous extracts were formed to study mosquito larvicidal effects.

The most significant group of blood-sucking arthropods is the mosquito family. They not only irritate people by biting, but they can spread dangerous infections that affect a wide range of socioeconomic consequences. Global climatic changes are to blame for the situation's worsening during the past ten years.

This has helped them, along with other variables, to adapt to a variety of habitats and consequently grow their population in various regions of the world. Many harmful organisms producing diseases like Malaria, Filariasis, Japanese Encephalitis, Dengue fever, Yellow fever, etc. are transmitted by several mosquito species belonging to the genera Anopheles, Culex, and Aedes. These diseases are contagious on a global scale, leading to high rates of human death and obstructing the economic growth of the majority of developing nations worldwide. It has been attempted to reduce or completely eradicate mosquito populations by using a variety of insecticides and chemical compositions. These pesticides are threatened by mosquitoes developing resistance to chemical insecticides, which leads to rebounding vectorial capacity even though they are very effective against the target species. Many environmental and human health problems have been sparked by the long-term stability of many of these pesticides and their propensity to bioaccumulate in creatures that are not their intended targets. Due to their abundance in bioactive chemicals, ease of availability, environmental safety, etc., plant secondary metabolites are viewed as a promising alternative strategy against numerous mosquito species and their various juvenile stages.

The activity of crude aqueous extracts from 14 different plants of Jharkhand, Hazaribag were investigated in the current study as part of ongoing efforts to find plant extracts with mosquito larvicidal properties. The results of the investigations in this area will be helpful in encouraging research aimed at the creation of new mosquito-controlling substances derived from local plant sources.

## II. MATERIAL AND METHODS

### *A. Collection of Plants*

Plants collected from the area of Ranchi and Hazaribag of Jharkhand, India. All these were then brought to the Univesity Department of Biotechnology, Vinoba Bhave University, Hazaribag. All the plant parts were first washed by tap water and then by double distilled water three to four times and then kept for drying either in shaded area or in hot air oven at $40^{O}$c till plat parts become dry. The details of collection of plants is summarised in Table-1.

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*B. Plant's Extract Formation*

The process of maceration was used for plant's extract formation. Details are given in Table-2.

*C. Plant Extract Concentration*

Concentration of all plant extract for the Mosquito Larvicidal assay was made 30mg/ml.

*D. Mosquito Culture*

For growing mosquito larvae, four old tyres were cut, placed in the garden at shaded area and was filled with water. It was then kept undisturbed for some days and wait for female mosquito to lay egg. After some days (3-4 days) small mosquito larvae were seen floating on the water surface. According to the floating pattern and resting position on the surface of water, the larvae of Culex mosquito was selected out at early 4$^{th}$ instar and taken for larvicidal assay. Difference between the larvae of Culex, Aedes and Anopheles mosquito is given in Table:3 below, which is used for screening of Culex mosquito larvae.

TABLE: 1
DETAILS OF PLANT COLLECTION AND IT'S FAMILY

| Sl.No. | NAME OF PLANTS | | Site of Collection / Place | Month-Year of Collecton | Lattitude | Longitude | Plant's Family |
|---|---|---|---|---|---|---|---|
| | SCIENTIFIC NAME | LOCAL NAME | | | | | |
| 1 | *Alternanthera philoxeroides* | Alligator weed | Hazaribag | Jul-22 | 24.02116512 | 85.38259052 | Amaranthaceae |
| 2 | *Kalanchoe pinnata* | Pattharchatta | Ratu Road, Ranchi | Jul-22 | 23.379474 | 85.303406 | Crassulaceae |
| 3 | *Opuntia elatior* | Nagfani, Red flower prickly pear | Hazaribag | Jul-22 | 24.02077681 | 85.38453244 | Cactaceae |
| 4 | *Centratherum punctatum* | Lark Daisy | Hazaribag | Jul-22 | 24.02077681 | 85.38453244 | Asteraceae |
| 5 | *Colocasia esculenta* | Arabi, Kachchu | Hazaribag | Jul-22 | 24.02077681 | 85.38453244 | Araceae |
| 6 | *Cordyline fruticosa* | T - Plant | Ratu Road, Ranchi | Jul-22 | 23.379474 | 85.303406 | Asparagaceae |
| 7 | *Cyperus eragrostis* | Nutgrass | Hazaribag | Jul-22 | 24.02219681 | 85.3743643 | Cyperaceae |
| 8 | *Duranta* | Nilkanta | Hazaribag | Jul-22 | 24.02324405 | 85.37792767 | Verbenaceae |
| 9 | *Euphorbia tithymeloides* | Agiya | Hazaribag | Jul-22 | 24.02808583 | 85.3742775 | Euphorbiaceae |
| 10 | *Ixora javanica* | Rukmini | Hazaribag | Jul-22 | 24.02808583 | 85.3742775 | Rubiaceae |
| 11 | *Jatropha gossypiifolia* | Ratanjoti, Bio-Diesel Plant | Hazaribag | Aug-22 | 24.01623186 | 85.38004435 | Euphorbiaceae |
| 12 | *Martynia annua* | Hatha-Jodi, Devil's Claws | Hazaribag | Aug-22 | 24.01229203 | 85.3911435 | Martyniaceae |
| 13 | *Persicaria longiseta* | Oriental lady's thumb | Hazaribag | Aug-22 | 24.02116512 | 85.38259052 | Polygonaceae |
| 14 | *Stachyterpheta indica* | Indian Snakeweed | Hazaribag | Jul-22 | 24.02003846 | 85.36962373 | Verbenaceae |

TABLE: 2
DETAILS OF METHODS OF PLANT EXTRACT PREPARATION AND CONCENTRATION

| Sl.No. | Scientific Name | Plant Part Used | Method of Drying | Plant Parts Dry Weight(grams) | Method of Drying of Filterate | Dry Pellet's Weight (mg) | Concentration of Stock Solution (mg/mL) |
|---|---|---|---|---|---|---|---|
| 1 | *Alternanthera philoxeroides* | Flower | Hot Air Oven, 40°C | 1.21 | Hot Air Oven, 40°C | 123 | 30 |
| 2 | *Alternanthera philoxeroides* | Leaf | " | 3 | " | 468 | 30 |
| 3 | *Alternanthera philoxeroides* | Stem | " | 3 | " | 693 | 30 |
| 4 | *Bryophyllum* | Leaf | Air Dry | 10 | " | 1988 | 30 |
| 5 | *Cactus Opuntia* | Spine | Hot Air Oven, 40°C | 8.35 | " | 121 | 30 |
| 6 | *Cactus Opuntia* | Flower | " | 5 | " | 430 | 30 |
| 7 | *Cactus Opuntia* | Leaf | " | 10 | " | 2507 | 30 |
| 8 | *Cactus Opuntia* | Green Ovary | " | 5.955 | " | 292 | 30 |
| 9 | *Centratherum punctatum* | Leaf | " | 6 | " | 635 | 30 |
| 10 | *Centratherum punctatum* | Flower | " | 5 | " | 331 | 30 |
| 11 | *Colocasia esculenta* | Leaf | " | 15 | " | 1040 | 30 |
| 12 | *Colocasia esculenta* | Stem | " | 11.46 | " | 1216 | 30 |
| 13 | *Cordyline fruticosa* | Leaf | Air Dry | 10 | " | 1312 | 30 |
| 14 | *Cyperus eragrostis* | Leaf | " | 4.32 | " | 199 | 30 |
| 15 | *Cyperus eragrostis* | Root | " | 5.28 | " | 216 | 30 |
| 16 | *Cyperus eragrostis* | Flower | " | 2.13 | " | 117 | 30 |
| 17 | *Duranta* | seed | " | 5 | " | 687 | 30 |
| 18 | *Euphorbia tithymeloides* | Leaf | " | 7.5 | " | 1991 | 30 |
| 19 | *Euphorbia tithymeloides* | Stem | Hot Air Oven, 40°C | 5 | " | 651 | 30 |
| 20 | *Ixora coccinea* | Flower | " | 12.61 | " | 1251 | 30 |
| 21 | *Jatropha gossypiifolia* | Leaf | " | 10 | " | 981 | 30 |
| 22 | *Jatropha gossypiifolia* | Flower | " | 7 | " | 524 | 30 |
| 23 | *Jatropha gossypiifolia* | Fruit Cover | " | 5 | " | 243 | 30 |
| 24 | *Jatropha gossypiifolia* | seed | " | 8 | " | 455 | 30 |
| 25 | *Jatropha gossypiifolia* | Stem | " | 17.6 | " | 1305 | 30 |
| 26 | *Martynia annua* | Flower | " | 7.54 | " | 995 | 30 |
| 27 | *Martynia annua* | Leaf | " | 10 | " | 346 | 30 |
| 28 | *Martynia annua* | Stem | " | 20.1 | " | 1072 | 30 |
| 29 | *Persicaria longiseta* | Leaf | " | 5 | " | 402 | 30 |
| 30 | *Persicaria longiseta* | Flower | " | 1.149 | " | 102 | 30 |
| 31 | *Stachyterpheta indica* | Leaf | Air Dry | 2 | " | 995 | 30 |
| 32 | *Stachyterpheta indica* | Flower Bud | " | 20 | " | 1774 | 30 |
| 33 | *Stachyterpheta indica* | Flower | " | 1.8 | " | 355 | 30 |

TABLE: 3
DIFFERENCE BETWEEN CULEX, AEDES AND ANOPHELES MOSQUITO LARVAE:

| Culex | Aedes | Anopheles |
|---|---|---|
| Larvae floats obliquely to the surface of water | Larvae floats horizontally to the surface of water | Larvae floats obliquely to the surface of water |
| It rests at a certain angle to the water surface | It rests parallel to the water surface | It rests at a certain angle to the water surface |

## III. LARVICIDAL ACTIVITY

With some modification, in "WHO/CDS/WHOPES/GCDPP/2005.13 GUIDELINES FOR LABORATORY AND FIELD TESTING OF MOSQUITO LARVICIDES", mosquito larvicidal experimentation was designed. The mosquito was feed with aquarium diet[12]. Five larvae, each were introduced into treatment container/beaker containing 25mL of their natural growth media. The efficacy was determined through[13] bioassay method. Different volume of plant extract (Stock concentration 30mg/mL) was added in beaker to get different concentration (20, 40, 80, 160, 320, 640, 1280, 2560 ug/ml) of plant extract. All these concentrations are maintained at triplicate so as to do statistical analysis. A control was also established for treatment set where the water on which larvae were grown was used. Larval mortality counts were checked at predetermined intervals, including 6, 12, 24, and 48 hours following treatment. Larvae were considered to be dead if they sank to the bottom of the treatment tray, stayed still, showed no response to light or sound, or failed to regain life functions even after being moved to a control water solution.

## IV. RESULT AND DISCUSSION

Observation obtained after doing larvicidal assay for all the concentarion for 6, 12, 24, and 48 hours is summarised in Table:4. *Alternanthera philoxeroides* flower showed 40% larvicidal effect at 320µg/ml at 1$^{st}$ 6 hrs but after that no effect was observed even after increasing the concentration. *Opuntia elatior* flower and leaf, *Centratherum punctatum* leaf, *Colocasia esculenta* leaf, *Cyperus eragrostis* root and flower at 320µg/ml showed 20% larvicidal [13]effect at 24$^{th}$ hrs, 6$^{th}$ hrs, 24$^{th}$ hrs, and 48$^{th}$ hrs respectively and also larvicidal effects was not observed by increasing the concentration.

## V. CONCLUSION

All the 33 plant's aqueous extract showed no significant mosquito larvicidal effect.

## VI. ACKNOWLEDGMENT

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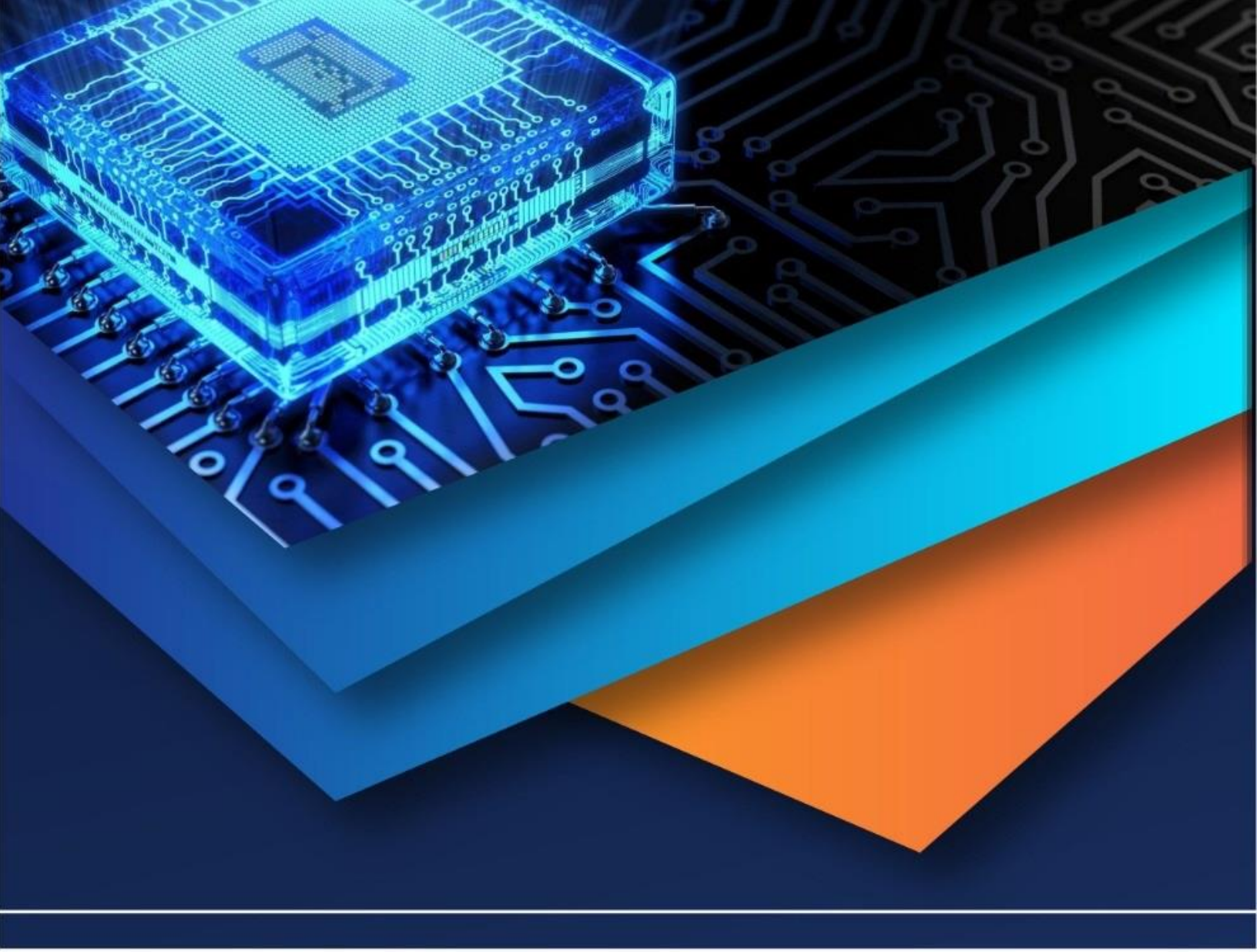
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TABLE: 4
Mosquito Larvicidal Effect by Plant Extracts in 48 Hrs Reading at Different Concentrations

| Sl No. | Plant's Name | Plant Part Used | Volume of Water Used (mL) | Number of Larvae in each Plate | Number of Replica in each Concentration | Total Number of Larvae | Concentration (µg/mL) | | | | Concentration (µg/mL) | | | | Concentration (µg/mL) | | | | Concentration (µg/mL) | | | | Concentration (µg/mL) | | | | Concentration (µg/mL) | | | | Concentration (µg/mL) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 20 | | | | 40 | | | | 80 | | | | 160 | | | | 320 | | | | 640 | | | | 1280 | | | | 2560 | | | |
| | | | | | | | Death of Larvae | | | | Death of Larvae | | | | Death of Larvae | | | | Death of Larvae | | | | Death of Larvae | | | | Death of Larvae | | | | Death of Larvae | | | |
| | | | | | | | 1st 6 Hrs | 12 Hrs | 24 Hrs | 48 Hrs | 1st 6 Hrs | 12 Hrs | 24 Hrs | 48 Hrs | 1st 6 Hrs | 12 Hrs | 24 Hrs | 48 Hrs | 1st 6 Hrs | 12 Hrs | 24 Hrs | 48 Hrs | 1st 6 Hrs | 12 Hrs | 24 Hrs | 48 Hrs | 1st 6 Hrs | 12 Hrs | 24 Hrs | 48 Hrs | 1st 6 Hrs | 12 Hrs | 24 Hrs | 48 Hrs |
| 1 | *Alternanthera philoxeroides* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | *Alternanthera philoxeroides* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | *Alternanthera philoxeroides* | Stem | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | *Bryophyllum* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | *Cactus Opuntia* | Spine | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | *Cactus Opuntia* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | *Cactus Opuntia* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | *Cactus Opuntia* | Green Ovary | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | *Centratherum punctatum* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | *Centratherum punctatum* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | *Colocasia esculenta* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | *Colocasia esculenta* | Stem | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | *Cardiline fauicosa* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | *Cyperus eragrostis* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | *Cyperus eragrostis* | Root | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | *Cyperus eragrostis* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | *Duranta* | seed | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | *Euphorbia tithymeloides* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | *Euphorbia tithymeloides* | Stem | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | *Ixora coccinea* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | *Jatropha gossypiifolia* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | *Jatropha gossypiifolia* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | *Jatropha gossypiifolia* | Fruit Cover | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | *Jatropha gossypiifolia* | seed | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | *Jatropha gossypiifolia* | Stem | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | *Martynia annua* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | *Martynia annua* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | *Martynia annua* | Stem | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | *Persicaria longiseta* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | *Persicaria longiseta* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | *Stachytepheta* | Leaf | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | *Stachytepheta* | Flower Bud | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | *Stachytepheta* | Flower | 25 | 5 | 3 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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