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Study of Illustrated Key to the Species of Genus Calotropis for Easy Identification

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ABSTRACT *In the recent years there has been growing interest in plant diversity studies in general and floristic studies in particular Illustrations of plants are as old as human civilization and yet, there is ever greater need for good Illustration. Everyone including the specialist, knows that a good Illustration is far superior and more efficient in recognizing plants than lengthy descriptions, or even keys. The present work is a sincere attempt to provide an illustrative key to species of genus Calotropis. Method includes ,Field study ,Herbarium study & Illustrations based on plant specimens. Besides the time consuming process of correct identification of plant species can be minimized, if such flora is easily accessible available at the nearest reference point.*

KEYWORDS: Illustrated key, genus Calotropis , Identification

Introduction

Illustrations of plants are as old as human civilization and yet there is ever greater need for good illustrations . Everyone including the specialists knows that a good illustrations is far superior and more efficient in identification of plants than lenthy descriptions or even keys .

In the recent years there has been growing interest in plant diversity studies in general and floristic studies in particular. In this connection regional floristic studies are of much importance. It can be achieved by intensive exploration of smaller areas. Such attempts have been made by taxonomists and other botanists in various research institutes and teachers in degree colleges.

Of large number of plant species reported on the ethno botanical interest, the two species of Calotropis R. Br. Viz., C. gigantean and C. Procera in India holds a pride of place largely because of its medicinal uses and economic values . In our study we have described key to the species of one of the important genus i.e Calotropis . In this study we have described key to the species of genus Calotropis i.e C. gigantean , C.procera .

There is stray floristic work on various talukas of Pune district. These floristic works i.e. the floras or check lists, very rarely provide illustrations, 1-2 which is a easy mode of comparing, verifying and identification plants.

The present work is a sincere attempt to provide an illustrative key to species depicting important morphological characters to identify the plants easily to give structural details and discriminate the characters of taxonomic importance to identify the plant as they are having different medicinal uses and economic values . The present work is based on the results of about intensive exploration of genus Calotropis so that it provide a simple key to the species to identify twospecise of C. gigantean , C.procera in the Pune and adjoining regions of Pune district.

Of large number of plant species reported on the ethno botanical interest, the two species of Calotropis R. Br. Viz., C. gigantean and C. Procera in India holds a pride of place largely because of its medicinal uses and economic values . In our study we have described key to the species of one of the important genus i.e Calotropis . In this we have described species of genus Calotropis i.e C. gigantean , C.procera .

MATERIALS AND METHOD

The present works is based on the result of intensive explorations to the study of plants of the species of genus Calotropis i.e C. gigantean , C.procera . . The study was undertaken by Field study , Herbarium study , Illustrations based on plant specimens.

Pune and adjoining regions mentioned as above is approachable by own vehicle during all seasons. A major bulk plants of collected in rainy seasons because majority of the flowering plants found in rainy reasons and especially some ephemeral plants are only found in monsoon period.

While collecting the specimens, the data such as habit, habitat, flower colours, fragrance if present, frequency of distribution, local names and uses, if any were recorded in the field itself. Besides the wild species, some cultivated plants, weeds of cultivated field and road sides have also be collected. These specimens collected were pressed in the field using blotting and old newspaper. The flowers of some of the species which were of some botanical interest were fixed in 4% formalin for further studies in the laboratory.

These specimens have been deposited in the herbarium of University of Pune, Deptt. of Botany, Pune 411007. Generally 3-4 specimens of the each plant were collected. Two specimens were mounted and others were treated as duplicate specimens.

Preparation of Herbarium sheets. The plant specimens which are carefully collected taking care that the specimens are healthy, free from evidence of insect feeding, rust infections, and other obvious pathological symptoms. It was ensured that the specimen is either in flowering or fruiting condition. The specimen is herbaceous, always include enough of the underground parts to show their characters.

The plant specimens pressed on the spot and some time collected in vasculum and pressed after coming to laboratory. While collecting the specimens, the data such as habit, habitat, locality, local name, etc. have been immediately recorded in the field diary. After returning to the laboratory, the plant specimen have been pressed in between the sheets of blotting paper. One plant should be arranged, on one sheet in a manner that there should be no over lapping of parts. The large size specimens have been folded in 'V', 'Z', 'W' 'C' shape. The blotting papers with plant specimens have been placed in field press for about 24 to 48 hrs. The press is then opened, blottings have been changed and rearranged the plant specimen properly. This practice made continuous for 10 to 15 days till the specimens get properly dried.

Poisoning : - Poisoning of the specimen have been done immediately after collection ; all the specimens were poisoned in aqueous solution of Mercuric chloride and dried using standard herbarium techniques. After drying, the specimens were mounted for permanent record on herbarium sheets. The herbarium sheets of standard size 42 cm X 28 cm; and such standard herbarium sheets have been used. The specimens were mounted on the sheets with the help of glue or by stitched wherever necessary with help of cotton thread.

The plant specimens have been tentatively identified in the field and identification was confirmed by using different floras. The important floras such as "Flora of presidency of Bombay" by Theodore Cooke (1958), [3,4] "Flora of British India" (1872 to 1897) by J. D. Hooker [5], "Flora of Presidency Madras" (Gamble, 1957) [6]"Flora of Akola District, Maharashtra" by S. Y. Kamble and S.G. Pradhan (1988) [7], " Flora of Maharashtra state" (2000) by N. P. Singh [8] & S. Karthikeyan Flora of Mahabaleshwar and adjoins, by Deshpande (1995) [9], "Flora of Nasik" by Lakshminarsimhan (1991) [10], "Flora of Raigad by Kothari and Moorthy (1993) [11]The cultivated species were also identified with the help of Manual of Cultivated Plants by Bailey (1949). [2] Then again the specimens confirmed by matching with authentically identified specimens deposited in the herbarium of Botanical Survey of India, Western Circle Pune.

Methodology of Illustrations:- A depiction of the habit, alongwith finer structural details especially of flower and fruit in a comparable format was the main purpose. Thus the details depicted are taxonomically significant. Following the general pattern of one plate per species, the first step was to visualize the number of sketches involved and scale suitable to the illustration i.e. reduction of larger organ and enlargement of smaller ones.

Depiction of the twig as visual aid to recall the plant characters is important. Thus special efforts were made to make the habit sketch and dissections from the same specimen in order to avoid errors.

A photograph of the specimen from the same collection was most useful in rounding off the habit sketch. To satisfy this purpose an extensive field work was carried out in the study area in various seasons to capture the flowering and fruiting season of plants.

The plant parts were detached from the twig, and examined under a binocular dissection microscope under suitable magnification (X5 or X 10 is usually sufficient). Almost all the details were studied. Serial sketching of structure in order (Calyx, Corolla, Androecium, Gynoecium, Fruit) with detail was done. All the sketches were drawn with fresh specimen and with hand by using isograph drawing pens with zeichentusche drawing ink on A4 size bond paper and scanned for further DTP work in Photoshop, then it was inserted is MS- word and edited for labeling, numbering and preparation of keys. The sketches were made first with pencil, with suitable scale (X 5) in case of minute flowers the magnification was X2- X20 times of the original specimen. In case of large specimen five to twenty times reduction was done. All the sketches are calibrated and suitable magnifications have been shown near the sketch.

The advantage of keeping the same scale of magnification/ reduction for comparable structure within the taxon or for all the species enables us to emphasize the actual scale of various plant parts.

From the printed plate, which usually gets reduced in size during DTP or printing it is possible to compute back the original values, both of the sketch and the actual material. The sketches aim to convey maximum information for which all parts are illustrated : habit, flower, calyx, corolla, stamen (front and back view), pistil, ovary (V.S. and T.S.), fruit and seeds. Scale is individually given to all figures.

The genus Calotropis was arranged in the modified Bentham and Hookers system of classification, followed in India. Within genera the species are given in alphabetical order. An index gives the names of families genera and species as well as vernacular names.

The discriminating morphological character is placed below the description in form of the actual sketch of the selected character in the indented key e.g leaves, stamens, flowers, fruits etc. lots of efforts have gone on to this DTP work to prepare the illustrated key. All the sketches here are given with scale, so as to calculate the actual size of the specimen.

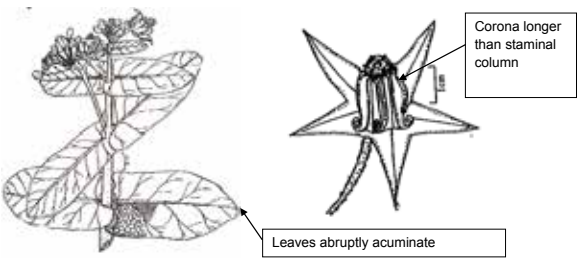
The plants described are illustrated, so that even non botanist can know what is what. Finally we have no pretension that this is the last word on this topic. Probably a more extensive explanatory study might reveal more of such variations, even within Maharashtra.

Observation & Result:

CALOTROPIS R.Br.

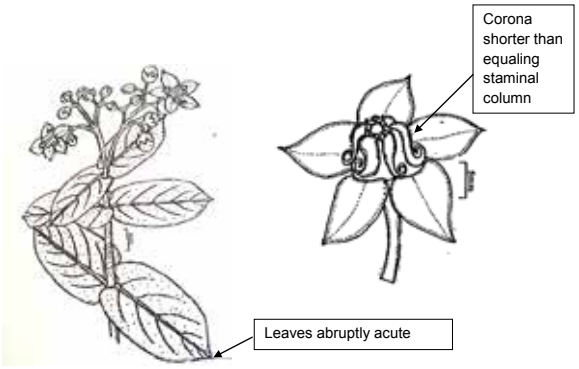
Key to the species.

1. Leaves abruptly acuminate; sepals glabrous;
corona longer than staminal column … C. gigantea



C. gigantean (L.) Ait.

1. Leaves acute; sepals cottony pubescent;
corona shorter than equaling staminal column … C.procera



C.procera (Ait) R.Br.

Discussion :

This work will provide a handy tool to those, who wish to work in the field of taxonomy. The pictorial keys enable the researcher to identify the plants by matching the characters with the illustrations which are drawn with scale. So the confusion generally created while reading the information of plant can be minimized. More extensive keys could have been prepared, but due to time constraint, which may be taken up in near future.

There have been innumerable thesis, research papers, projects going on where many ideas have been expanded, still basic need of floristic study is, correct identification of floristic elements in the field. We as researchers or botanist, get to realize the heavy price we will have to pay in future, if we don't start such work today. These Illustrations are good enough as regard the habit of plant but not for the structural details. These old volumes are scarce, no larger in print and becoming beyond the reach of common research student or college teachers working on floristics. There is also ever greater need for good illustration.

C.gigantea is more often used as medication that C. procera. In the table, where the specific names are available are indicated. But in most of the cases, the two species are used alternatively or the species available in the area. The local name of the species are generally referred in the articles.11

C.gigantea , are used as a remedy for snake bite or scorpion sting, but all parts are quite useless in the antidotal and symptomatic treatment of either snake bite or scorpion sting. Use of C.procera as tooth brush enhances the analyze activity also in support of the use of the root as digestive agent. Jain et al 12 prescribed capsulated root bark powder to the patients of Diarrhoea and Dysentery, found significant results and considered that the drug is an excellent substitute for ipecacuanha

So both the plants are having their own medicinal use and must be identified accurately but due to same species their identification becomes difficult in the field due to many similar characteristics. e.g in C. gigantean if you read leaves abruptly acuminate Leaves abruptly acuminate; sepals glabrous (smooth); corona longer than staminal column & C.procera . Leaves acute; sepals cottony pubescent (hairy); corona shorter than equaling staminal column but with the help of our illustrated keys we can show it easily so that identification becomes more easy by using this key to species .

This work will provide a practical introduction to the techniques of documentation in taxonomy to study the plant genetic resources. Besides the time consuming process of correct identification of plant species can be minimized, if such flora is easily accessible available at the nearest reference point. Instead of wasting time and paying heavy fees which such institute ask for identification, one can easily go through the illustrative keys and identify the plant, within no time. Therefore such kind of floras are need of time today and in future.

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