

## TAXONOMICAL STUDIES OF SELECTED ORNAMENTAL PLANTS

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### Abstract

The neglect of ornamental horticulture by researchers in Nigeria is now more evident than ever. This might be attributed partly to general lack of interest in ornamental studies and also partly due to plant identification problem. This work is therefore aimed at the collection, identification, description and propagation of eight ornamental plants of Nigeria [*Caladium bicolor* Wightii, *Chrysothemis pulchella* (Donn ex Sims) Decne., *Coleus blumei* Benth, *Episcia cupreata* (Hook) Hanst, *Impatiens balsamina* L., *Kalanchoe fedtschenkoi* Hamet and Perr 'Marginata', *Pellaea rotundifolia* (G. Forst) Hook and *Rhoeo spathacea* (discolor) Hance]. The plants were collected in Osun-State, Nigeria and identified using standard horticultural literatures and herbarium specimens of the Department of Botany, Obafemi Awolowo University, Ile-Ife, Nigeria. The plants were raised in triplicates at the screen house. Data were collected on growth parameters. Morphological observations showed that the plants were herbaceous and annuals with simple leaf habit. There were variations in the shapes of their apex, base, margin, calyx and petal. The number of their calyx, petal and the leaf arrangement also differ. Reticulate venation was common to them with the exception of *C. bicolor* and *R. spathacea* with parallel venation. They possess actinomorphic flowers except *I. balsamina* with zygomorphic flowers. Almost all the plants studied are propagated by stem cuttings with the exception of *I. balsamina*, *P. rotundifolia* and *R. spathacea*. Their maturity periods range from 25-150 days. The need for awareness of the importance of ornamental plants for their values was discussed.

**Key words:** Ornamental plants, propagation, taxonomy, germination, maturity.

### 1. Introduction

Gill (1988) defined taxonomy as a study aimed at producing a system of classification of Biological organisms, which best reflects the totality of their similarities and differences. According to him, there are three inter-related aspects of taxonomy namely: Identification, Nomenclature and Classification. Identification deals with the determination of a taxon as being identical or similar to another and already known organisms. This can be achieved with the aid of literature or by comparison with organism of known identity. Nomenclature on the other hand has to do with determination of the correct name for the organisms and is governed by International Code of Botanical Nomenclature. It permits only a single valid name for each plant. Classification is the placing of plants in groups or categories according to particular plan or system.

According to Olorode (1984); Gill (1988); Datta (1991), the objectives of taxonomy are to provide: a convenient method of identifying, naming and describing plants, a classification which as far as possible express the natural relationships of organisms, detect evolution at work, discovering its processes and interpreting its results, an inventory of plant resources-local, regional and continental and to provide an integrating and unifying role in the training of Biology.

Ornamental horticulture is the branch of horticulture concerned with cultivating plants of all kinds for show and to satisfy the eye rather than for food (Bailey, 1960). It includes floriculture, the culture of trees for shades, display and landscape horticulture. Landscape horticulture is a special branch that deals with garden designs. It is concerned with making nature-like pictures, or at least with the general plan and setting of the place. It also comprises all the part of floriculture that aims at making grounds and gardens beautiful. Ornamental plants are plants produced for their aesthetic value and these include flowers, foliage, landscape plants, and turf grasses (Terri, 1994).

The aesthetic value of flowering plants in our homes, shady trees avenues, lawns, flower beds and variety of other features in the garden is highly important to human pleasure and comfort and cannot be measured in quantitative terms (Matthew and Karikari, 1990). Plants have aesthetic value owing to particular qualities like their beauty, aroma, economic values, and culinary values and in some cases financial gains. Floriculture has long been, and will continue to be, outlet for recreation and pleasure. Cultivation of the ornamental plants brings reward such as monetary gains and personal pleasure. Cultivation of the ornamental plants brings rewards such as monetary

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gains, and personal pleasure. Janick (1992) reported that in the United States of America, ornamental horticulture field employs thousands of people in hundreds of job specialities including growers, designers, maintenance personnel, researchers, garden center staff, mass-market florists, evaluator, horticultural therapists, advertisers, writers, seed specialists, retail and wholesale salespersons.

Ornamental horticulture has almost been ignored by researchers for some years now, especially in the developing countries like Nigeria. The reason might be that the people prefer to get something to satisfy their immediate food needs rather than their eyes. To bring researchers and farmers to the awareness of the importance of researching and cultivating these plants respectively, this work is therefore aimed at the collection, identification, description and propagation of selected ornamental plants in Osun State, Nigeria.

## 2. Materials and Methods

Eight species of ornamental plants were collected at different locations in Osun State, Nigeria. Their identities were confirmed in the herbarium and parks and garden, Obafemi Awolowo University, Ile-Ife. Standard horticultural and taxonomic literatures by Graf (1974), Olorode (1984), and Gill (1988) were also consulted, for proper identification and description. The plants studied are: *Caladium bicolor* Wightii, *Chrysothemis pulchella* (Donn ex Sims) Decne., *Coleus blumei* Benth, *Episcia cupreata* (Hook) Hanst, *Impatiens balsamina* L., *Kalanchoe fedtschenkoi* Hamet and Perr 'Marginata', *Pellaea rotundifolia* (G.Forst) Hook and *Rhoeo spathacea* (discolor) Hance.

The seeds, stem cuttings, corm and rhizomes of the plants under investigation were planted in triplicates on top soil in the pots and observed in the screen house of the Department of Botany, Obafemi Awolowo University, Ile-Ife. The germination / shooting and maturity / flowering time, as the case maybe, were observed and recorded.

## 3. Results

Descriptions of the Morphological Characters of the Plants:

*Caladium bicolor* Wightii (Fig. 1) is an herbaceous plant, with simple leaf, radical arrangement. The apex is apiculate, base hastate, margin wavy, venation parallel pinnate and shape hastate. The blade is olive green with red purple splotches. The inflorescence is spadix.

*Chrysothemis pulchella* (Donn ex Sims) Decne. (Fig. 2) is an herbaceous plant with bronzy-brown foliage, simple leaf, shape lanceolate, leaf cauline and opposite arrangement. The apex is acuminate, base acute, margin crenate and venation reticulate. The

leaf is dirty green and purple beneath. Inflorescence is cymose with monochasial cyme. The flowers are yellow to red, actinomorphic and pentamerous. The calyx is petaloid, gamosepalous and valvate. The petal is gamopetalous and valvate. The stamens are four and free, the stigma two and the ovary superior.

*Coleus blumei* Benth (Fig. 3) is an herbaceous plant with simple leaf, cauline and opposite arrangement. The apex is acute, base oblique and acute, margin parted, venation reticulate, leaves deeply lobed and scalloped in various shades of red and pink with narrow green or yellow edge. It does not produce flower.

*Episcia cupreata* (Hook) Hanst (Fig. 4) is an herbaceous plant with simple leaf, shape ovate, cauline and opposite arrangement. The apex is acute, base oblique, chordate and acute, margin crenulate, venation reticulate. The leaf is coppery and green underneath. Inflorescence is solitary and axillary. The flowers are orange to red, actinomorphic and pentamerous. The calyx polysepalous and valvate. The petal polypetalous and valvate. The stamen is four and free, the stigma one and the ovary superior.

*Impatiens balsamina* L. (Fig. 5) is an herbaceous plant, with simple leaf, lanceolate shape, cauline and alternate arrangement. Apex acute, base acute, margin serrate and venation pinnate reticulate. Inflorescence solitary and axillary. The flower is zygomorphic, with a cup-shaped petaloid calyx, five polypetalous petals and aestivation imbricate. The stamen five and joined, stigma one and the ovary superior. The plant has many varieties different only in the colour of the flowers (ranging from white to red) and the height.

*Kalanchoe fedtschenkoi* Hamet and Perr 'Marginata' (Fig. 6) is an herbaceous plant with simple leaf, ovate shape, cauline and opposite arrangement. Apex obtuse, base acute, margin crenate and venation reticulate. The leaf has an attractive spot, the colour is pale green beautiful margined creamy-white. Inflorescence polychasial cyme. Flowers are pink, actinomorphic and tetramerous. The calyx polysepalous and valvate. The petal polypetalous and valvate. The stamen eight and free. The stigma four and free, the ovary superior.

*Pellaea rotundifolia* (G.Forst) Hook (Fig. 7) is an herbaceous lower plant with whitish crozier arising from rhizome. The leaflets simple, ovate, cauline and alternate arrangement, with divers shapes and sizes. Apex truncate, obtuse and retuse, base truncate and oblique, margin crenulate and venation reticulate. A small fern, some possessing secondary and tertiary rachis. A fern with creeping rhizome, fronds are nearly uniform, erect and drooping. The leaflets are pinnate, evenly spaced dark green and waxy leathery. It produces no flower.

*Rhoeo spathacea* (discolor) Hance (Fig. 8) is an herbaceous plant with simple leaf, acicular shape,

Fig. 1: *Caladium bicolor*

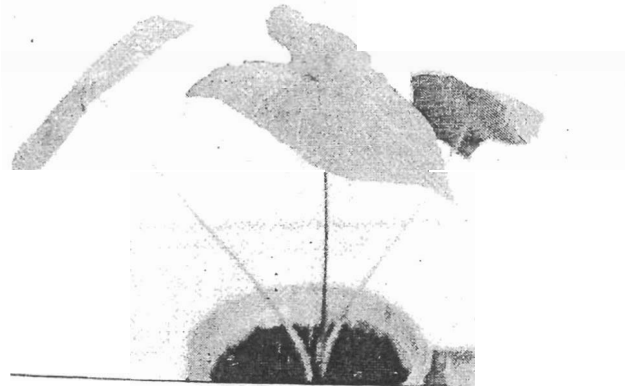


Fig. 2: *Chrysothemis pulchella*



Fig. 3: *Coleus blumei*



Fig. 4: *Episcia cupreata*



Fig. 5: *Impatiens balsamina*

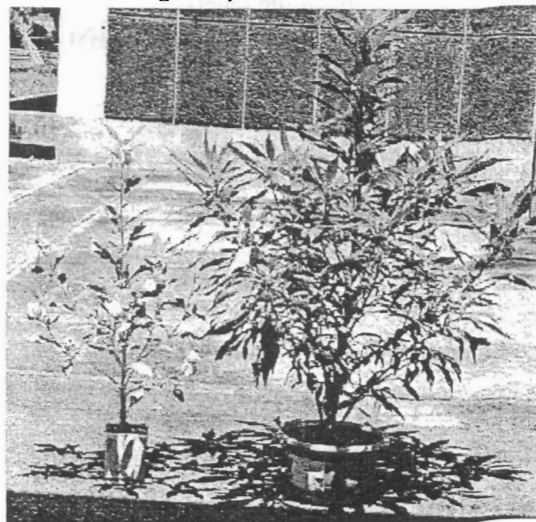


Fig. 6: *Kalanchoe fedtschenkoi*

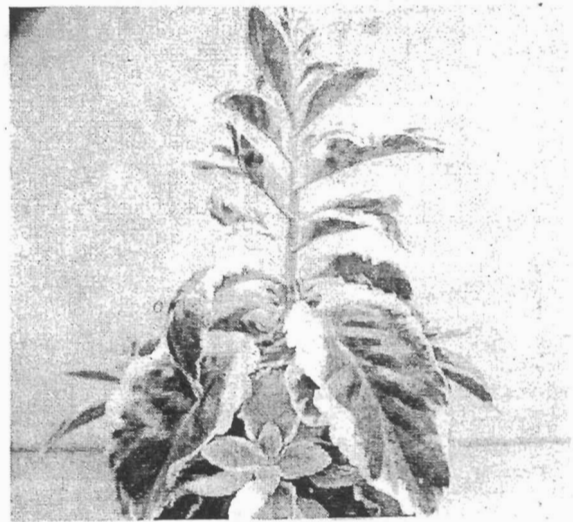


Fig 7: *Pellaea rotundifolia*Fig 8: *Rhoeo spathacea***Table 1:** Showing the origin and place of collection of the plants studied

S/No	Botanical Name	Common Name	Family	Origin	Collection Location
1.	<i>Caladium bicolor</i>		Araceae	Brazil Central	Ikirun
2.	<i>Chrysothemis pulchella</i>	Black Flamingo/ Sunset Bells	Gesneraceae	West Indies	Ile-Ife
3.	<i>Coleus blumei</i>	Frilled fantasy	Lamiaceae		Ile-Ife
4.	<i>Episcia cupreata</i>		Gesneraceae	Colombia	Ile-Ife
5.	<i>Impatiens balsamina</i>	Garden Balsam	Balsaminaceae	India to China	Imesi-Ife
6.	<i>Kalanchoe fedtschenkoi</i>	Aurora Borealis	Crassulaceae	Madagascar	Ile-Ife
7.	<i>Pellaea rotundifolia</i>	Lerry Plant	Adiantaceae	New Zealand	Ikirun
8.	<i>Rhoeo spathacea</i> (discolor)	Moses in the Cradle	Commelinaceae	Mexico	OAU Campus. Ile-Ife.

**Table 2:** Showing the height (cm), shooting, flowering/maturity periods of the plants

Scientific Name	Mode of Propagation	Height (cm) at maturity	Germination/shooting (days) after planting	Flowering/maturing (days) after planting
<i>C. bicolor</i>	(Corm) Stem	40 ± 0.58	10 ± 0.58	30 ± 1.15
<i>C. pulchella</i>	Stem cutting and tuber	35 ± 1.73	22 ± 0.58	32-55 ± 1.15
<i>C. blumei</i>	Stem cutting	45 ± 0.58	24 ± 1.73	54 ± 0.58
<i>E. cupreata</i>	Small plantlets at the ends of runners.	7 ± 1.15	13 ± 0.58	25 ± 0.58
<i>I. balsamina</i>	Seed	85-150 ± 1.73	45 ± 0.58	56-67 ± 1.15
<i>K. fedtschenkoi</i>	Stem cuttings	44 ± 1.73	24 ± 0.58	150 ± 1.15
<i>P. rotundifolia</i>	Creeping root and rhizome	35 ± 1.15	25 ± 1.15	100 ± 1.73
<i>R. spathacea</i>	Rhizome and seeds	30 ± 2.00	60 ± 1.00	73 ± 1.00

Values are means of 3 replications ± S.E.

with radical and alternate arrangement. Apex acute, base truncate, margin entire and venation parallel. Inflorescence is between 3-6 in an axillary boat-shaped involucre. Flowers are white, peeking from boat shaped involucre. The flower is actinomorphic and trimerous. The calyx is polysepalous and valvate, petals polypetalous and valvate too. Stamen six and free, stigma numerous and hairy and ovary superior. Table 2 shows that most herbaceous annual ornamental plants are propagated by stem cuttings with exception of few that are propagated by seed, rhizome, corm and creeping root in addition to stem cuttings. The results also show that *C. bicolor* matures about 30 days after planting from corm. *C. blumei* matures in about 54 days from stem cutting (15 cm long). *E. cupreata* flowers about 25 days after planting from stem / plantlet at the end of runners. *I. balsamina* flowers between 56-67 days after planting from seeds, depending on the variety. *K. fedtschenkoi* matures in about 150 days after planting from stem cuttings (15 cm long). *P. rotundifolia* matures in about 100 days after planting from creeping root. *R. spathacea* flowers in about 73 days after planting from rhizome.

#### 4. Discussion and Conclusion

In this work, the identification and description were done using conventional taxonomic procedures such as, use of herbarium materials, illustrations, photographs and use of flora. The taxonomic flavour added in this study makes it significant because of its facilitation of communication between scientists and ordinary plant enthusiasts. It also facilitates more research in the area of local, exotic, wild or cultivated ornamental plants.

For one to be successful in ornamental horticulture, the knowledge of how the plants are propagated is inevitable. Almost all the ornamental plants studied are propagated by stem cuttings with the exception of *I. balsamina* (Fig. 5) which is propagated by seed and *P. rotundifolia* (Fig. 7) by rhizome and creeping root. *E. cupreata* grows like a runner, extending thin stems that grow from the nodes of main shoot. These tiny stems / branches bear shoots at the tips which also grow roots at the base; this is the portion that is planted.

It should also be noted that there are some plants that have more than one mode of vegetative propagation like *C. pulchella* (Fig. 2) and *R. spathacea* (Fig. 8) which can be propagated by stem cuttings / tuber and rhizome / seed, respectively, with almost the same result. Almost all the plants produce flowers with the exception of *P. rotundifolia* (Fig. 7) which is a fern and *C. blumei* (Fig. 3).

The observation of the germination / shooting and maturity / flowering periods of the plants convey important information to those that are interested in raising and propagating horticultural plants.

There is a need for awareness of the importance of ornamental plants for their values such as aesthetic, aroma, medicinal and financial values. Using ornamental plants as a source of income cannot be over emphasized even in the developing countries, as there are many horticultural establishments springing up. Their cultivation and sales will help in alleviating poverty.

There are lots of ornamental plants that are yet to be collected. Many of the collected ones have not been identified and this can limit communication. There is a need for the taxonomic work on the ornamental plants for man to derive the total pleasure, satisfaction and comfort the plants give. Moreover, there are lots of plants in the wild that can be recruited as ornamentals. Most of the ferns in the wild can be good ornamentals if collected and potted or planted in beds. With this work as the basis, there is a big room for improvement, development and enlargement of ornamental horticulture.

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