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RESEARCH ARTICLE

INTRASPECIFIC DIVERSITYANGIOSPERM TAXA FROM FLORA OF TELANGANA, INDIA

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Abstract

The tendency of intraspecific variation among wild Angiosperms (Flowering plants) has been increasing in the modern times. The reason maybe the climate change, habitat disturbances, geographical isolation. The studies pertaining to the intraspecific taxa is very scanty though they were reported in the classical records (ca. 3000 years). To explore the intraspecific diversity among Angiosperm taxa and find out the intraspecific variations from the Flora of Telangana the studies taken up as part of the doctoral degree. A total of ca. 50 intraspecific Angiosperm taxa reported from the flora of Telangana. Out of them 19 taxa showing the variations in the floral and seed color presented in the present paper.

Introduction:-

Intraspecific variation: Variation “within species" or variation among individuals of the same species. The intraspecific taxain different populations or individuals in a single population usually have significant variations in external morphology such as leaf structure, flower color, seed color.The variation is based on genetical (genotype) heritable variation among populations or individuals, or variation ina morphology (phenotypic). Usually the intraspecific variations take place when the populations of the same taxa geographically or physiologically separated or changes in climatic and edaphic factors. In India, the intraspecific taxa and its variations mentioned from the vedic period (Atharva veda). There are seven different color seeds of “*Abrusprecatorius*” mentioned in the Siddha system of medicine, but it has not yet been recorded by the present-day scientific community(Balachandran and Rajendiran, 2015).However, in the modern times the tendency in intraspecific variations among wild angiosperms has been increasing but the studies are very scanty and missing in the many published floras (Gamble, 1924;Pullaiah, 2015;ReddyandReddy,2016).To explore the intraspecific diversity among angiosperm taxa in the region of Telangana the problem has taken as part of the doctoral degree programme. The studies carried out from 2020 to 2024 in a period of three years. A total of ca. 50 intraspecific taxa reported from the flora of Telangana out of 1945 Angiosperm taxa (Pullaiah, 2015).In the present paper focused on only the intraspecific taxa showing the variations in flower and seed color. There are 19taxa out of 50 exhibits the floral and seed color variations discussed in detail. The taxa listed in the table (1) with their scientific name, family and intra specific variations. The live images of the typical form and the intraspecific variants provided in the figures 1 & 2. The updated nomenclature and family names provided for the given intraspecific taxa as per the plants of the world online (Powo, 2024).

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Table 1:- Intraspecific taxa exhibit variation in flower and seed color.

S.no.	Scientific name and Family	Intraspecific variations noticed
1	**Abelmoschus ficulneus** (L.) Wight &Arn. Malvaceae	Flowers white when they open and after pollination they are turning in topink. On the same individual white and pink flowers can be seen.
2	**Abrus precatorius** L. Fabaceae	**Typical form:** Flowers light pink, seeds red with black at hilum.
		Intraspecific variants: a) Flowers and seeds completely white. b) Flowers dark pink to violet and seeds completely black.
3	**Butea monosperma** (Lam.) Kuntze Fabaceae	**Typical form:** Flowers bright orange to scarlet red.
		Intraspecific variant: Buds white and the opening flowers completely yellow.
4	***Catharanthus roseus** (L.) G.Don Apocynaceae	**Typical form:**Flowers in pink colour.
		Intraspecific variant: Flowers completely white (naturally occurred not artificial/manmade).
5	**Calotropis gigantea** (L.) W.T.Aiton Apocynaceae	**Typical form:** Flowers light pinkish to violet.
		Intraspecific variant: Flowers completely white.
6	**Canavalia cathartica** Thouars Fabaceae	Flowers opening pink and after pollination they turn into violet. Both the colors can be seen in the same inflorescence on the same individuals.
7	**Catunaregam spinosa** (Thunb.) Tirveng. Rubiaceae	Flowers are opening white and after pollination they turn into bright yellow. Both white and yellow flowers together can be seen on the same individuals.
8	**Cleome chelidonii** L.f. Cleomaceae	**Typical form:**Flowers deep pink.
		Intraspecific variant: Flowers completely white.
9	**Clitoria ternatea** L. Fabaceae	**Typical form:**Flowers deep blue color and wing petals not as broad as standard petal.
		Intraspecific variants: **a)** Flowers deep blue color and wing petals enlarged and as equal as standard petal and appear like double corolla. **b)** Flowers in light blue or faded blue color. **c)** Flowers completely white. **d)** Flowers completely pinkish violet.
10	**Cullencorylifolium**(L.) Medik. Fabaceae	**Typical form:** Flowers in pale violet.
		Intraspecific variant: Flowers completely white with blue tinge at the centre.
11	**Crotalaria verrucosa** L. Fabaceae	**Typical form:** Flowers in deep blue color.
		Intraspecific variant: Flowers completely white.
12	**Evolvulus alsinoides** (L.) L. Convolvulaceae	**Typical form:** Flowers in deep blue color.
		Intraspecific variant: Flowers completely white.
13	**Ipomoea hederifolia** L. Convolvulaceae	**Typical form:** Flowers in bright red in color.
		Intraspecific variant: Flowers in bright yellow color.
14	**Malvastrum coromandelianum** (L.) Garcke	**Typical form:** Flowers in pale yellow to yellowish orange.
		Intraspecific variant: Flowers completely white.

	Malvaceae	
15	***Mesosphaerum suaveolens** (L.) Kuntze Lamiaceae	**Typical form:** Flowers in blue color.
		Intraspecific variant: Flowers completely white.
16	**Mimosa prainiana** Gamble Fabaceae	Inflorescence (Heads) initially they are in pink color and after pollination completely turn into white. Pink and white color heads can be seen on the same individuals.
17	**Nymphaea nouchali var. nouchali** Nymphaeaceae	Violet and pinkish white flowers observed on the different individuals in the single population in a natural habitat (not cultivars).
18	**Trianthema portulacastrum** L. Aizoaceae	**Typical form:** Flowers with pink color.
		Intraspecific variant: Flowers completely white colour.
19	**Vitex negundo** L. Lamiaceae	**Typical form:** Flowers in light or faded blue color.
		Intraspecific variant: Flowers in deep violet colour. Flowers completely white.

Figure 1:-Legend:- a. **Abelmoschus ficulneus.**b–c.**Abrus precatorius**typical form. **d–e.Abrus precatorius**blackvariant.f-g. **Abrusprecatorius** whitevariant.**h. Butea monosperma** typical form. **i.Butea monosperma** yellow variant.J.**Calotropis gigantea** typical form.k**. Calotropis gigantea** white variant**.**l.**Canavalia**

cathartica. m. **Catunaregam spinosa.n. Cleome chelidonii** typical form.**Cleome chelidonii** white variant. p.**Clitoria ternatea** typical form.q,r,s,t,u.**Clitoria ternatea** Intraspecificvariants.

Figure 2. Legend:- a.**Crotalaria verrucosa**typical form. **b.Crotalaria verrucosa**white variant**.c.Cullencorylifolium**typical form.**d.Cullencorylifolium**white variant. **e.Evolvulus alsinoides** typical form.f. **Evolvulus alsinoides** white variant. g.**Ipomoea hederifolia** typical form; h.**Ipomoea hederifolia** yellow variant.i.**Malvastrum coromandelianum** white variant. j.**Mesosphaerum suaveolens** typical form; k.**Mesosphaerum suaveolens** white variant. l.**Mimosa prainiana**. m-n. Nymphaea nouchali var. nouchali.o.**Trianthema portulacastrum** typical form. p.**Trianthema portulacastrum** white variant.q.Vitex negundotypical form. r.**Vitex negundo**violetvariant; s.**Vitex negundo** white variant.

Results and Discussions:-

The present studies on the exploration and documentation of intraspecific diversity in Angiosperm taxa reveals a total of ca. 50 species exhibits intraspecific variations from flora of Telangana. In natural habitatsthey are showing variations in leaf structure, flower color and seed color. Even after introduction in the garden the variations producing in their offspring's. Out of 50 intraspecific taxa there are 19 taxa exhibit variations in flower and seed color discussed here. The taxa showing the leaf variations not discussed in the present paper. The variations in the

flower and seed color noticed in the individuals among single populationsor among isolated populations of same taxa. In some of the taxa such as **Abelmoschus ficulneus,Canavalia cathartica,Catunaregam spinosa, Mimosa prainiana**theflower/inflorescence heads change the color after pollination very frequently observed (See Table 1, Figures 1 & 2) on the same individual.Inremaining taxa the floral and seed color variations among different individuals and different populationsnoticed. In a naturalized alien weed**Mesosphaerum suaveolens**the different individuals in a single population producing blue (Typical form)andwhite flowers (variant)reported. **A**nd also, In **Nymphaea nouchali var.nouchali**different individuals in a single population (in natural ponds)noticed blue and pinkish white flowers (See table 1, Figures 1 & 2). In remaining all other taxa intraspecific variations noticed in geographically isolated populations from the typical form the species.

Conclusions:-

Intra specificvariationsaretheminor morphological and molecular (genetic)variations within a species or among individuals of the same species occurring by naturally (not by hybridization and horticulture). The intraspecific variations lead to the formation of climatic races, ecotypes, infra-species and species (in the long run).And also the intra- specific trait variability can play a fundamental role in plant community responses to environmental change and community assembly (Balachandran and Rajendiran, 2015). There is anincreasing tendency of intraspecific variations among angiosperms in present days. Its need to be studied thoroughly region wise with respect to changes in temperatures, rainfall, humidity, altitudinal (Surana, 2021), phytochemical (Ramana, 2024) and molecular level (Zahid Ali, 2013;Marimuthu, 2020). The molecular studies will help in recognizing their taxonomic status (subspecies, variety, ecotypes) and avoid taxonomic confusion making them into a distinct species or subspecies and infra-species by the traditional taxonomists/botanists.

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