ON SPECIES OF *Calotropis* R. Br.: EVOLUTION IN ACTION AND LIVE STANDARDS FOR CLIMBER CROPS.

By

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Introduction: Calotropis

- A medicinal weed of asclepiadaceae family.
- A xerophytic plant with many uses and potential. Grows well under normal mesic conditions.
- On the way to domestication.

4 types of *Calotropis*

- 1. *C. gigantea* blue (cgb)
- 2. *C. gigantea* white (cgw)
- 3. *C. procera* blue (cpb)
- 4. *C. procera* white (cpw)
- The question is that whether these four types could be considered as four different species?

1. *C. gigantea* blue (cgb)

2. C. gigantea white (cgw)

3. C. procera blue (cpb)

4. C. procera white (cpw)

A bit closer to what I wanted to show here.

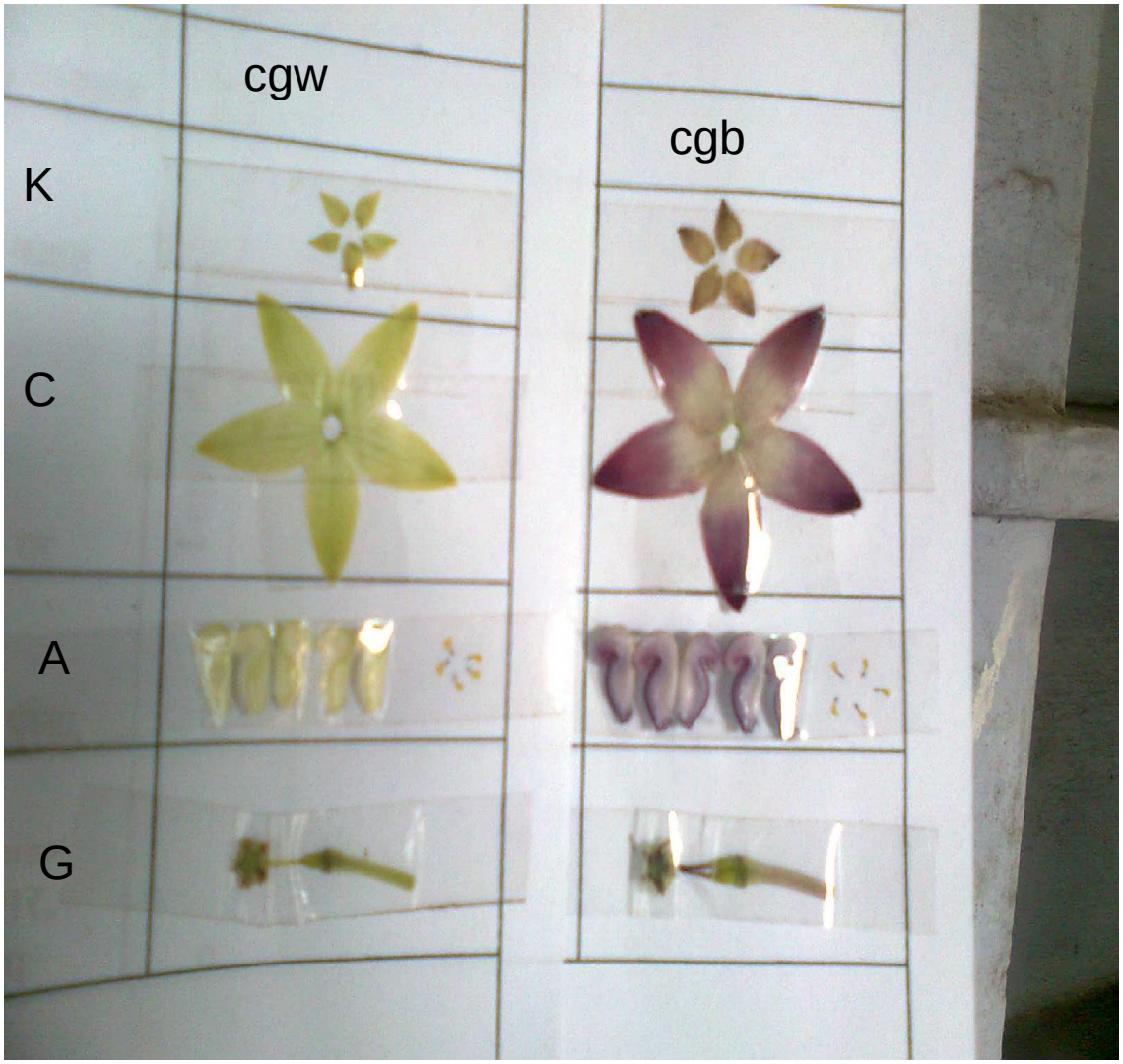
Both *gigantea & procera* (blue)

Cg (white and blue)

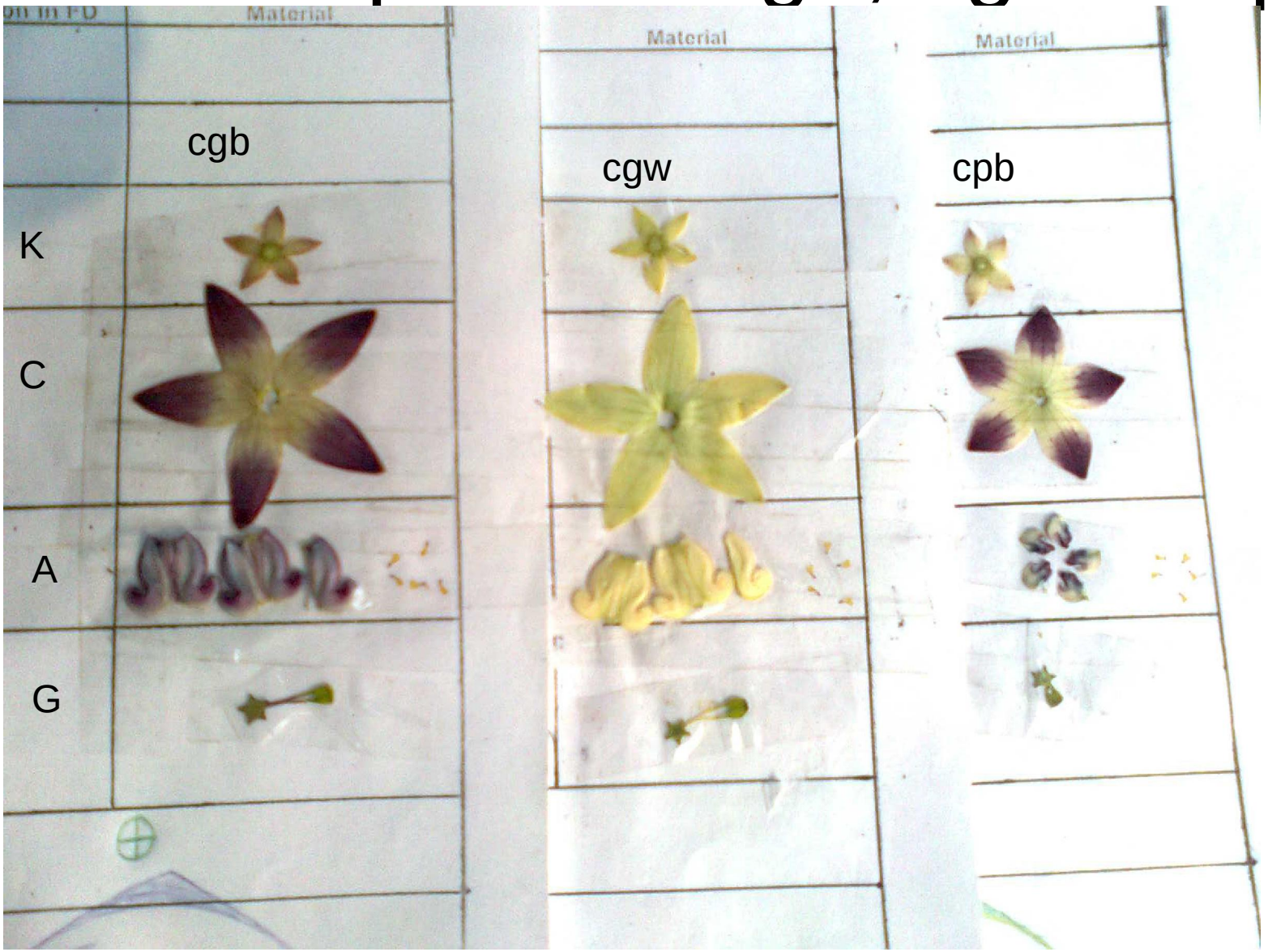
Methods

- 1. study morphological features,
- 2. examine scatter plots,
- 3. look into karyotypes and the **cytological behaviour of chromosomes**,
- 4. try transplantation experiments under uniform environmental conditions and
- 5. do breeding experiments to check whether the characteristic features show segregation in the offspring.

Floral parts of cgw & cgb



Floral parts of cgb, cgw & cpb



		cgw	cgb	cpb
K	Color	white	blue	less blue
	sepals	big	small	very small
C	Color	white	blue	blue+white
	Petals	long	a bit small	smallest
A				
	Corona Size	Medium	long	small
	Corona Shape	smooth curve	smooth curve	pointed
	Corona color	white	blue	blue+white
	Translator	small	long	smallest
	corpusculum	light black	dark black	very light black
	Retinaculum	small	long	smallest
	Pollinium	small	long	smallest
G				
	Style length	long	long	short
	Style color	white	blue	white
	Gynostegium	small	big	small
	Ovary	big	big	short

Androecium comparison

Nectar content			
Corona Size	Medium	long	small
Corona Shape	smooth curve	smooth curve	pointed
Corona color	white	blue	blue+white
Translator	small	long	smallest
corpusculum	light black	dark black	very light black
Retinaculum	small	long	smallest
Pollinium	small	long	smallest

Deoria, Eastern U.P.

1. *C. gigantea* blue (cgb)
2. *C. gigantea* white (cgw)
3. *C. procera* blue (cpb)

Cgb & cgw in Deoria

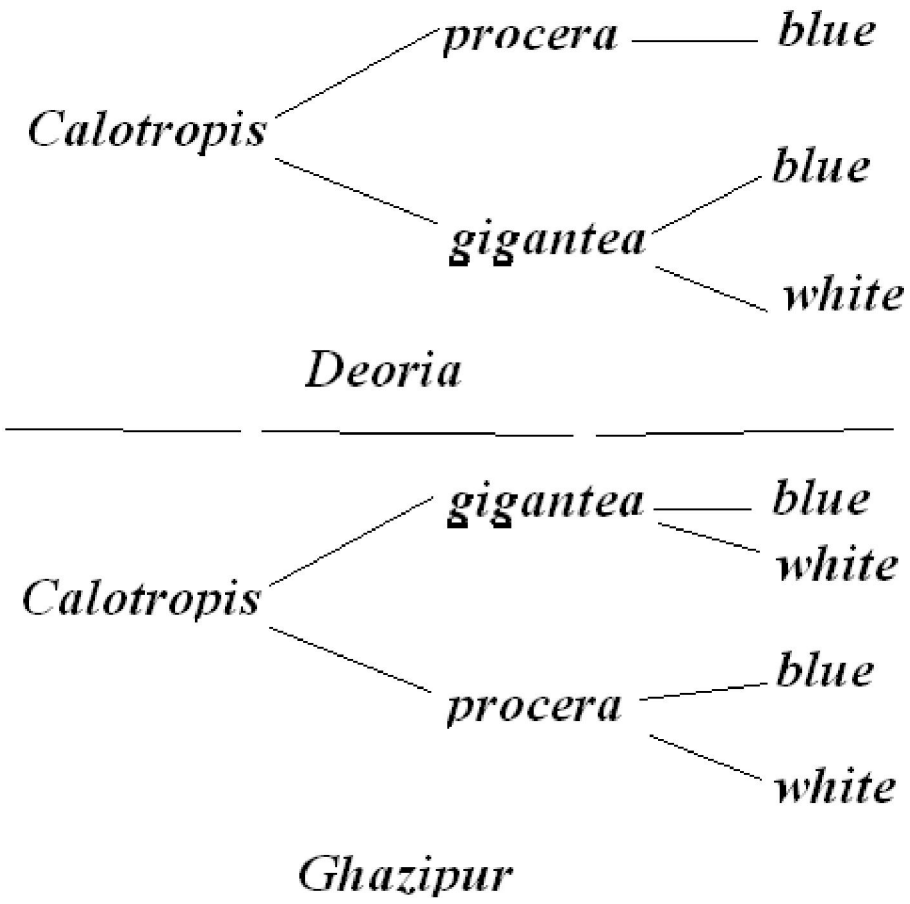
Ghazipur, Eastern U.P.

1. *C. gigantea* blue
2. *C. gigantea* white
3. *C. procera* blue
4. *C. procera* white

Ghazipur

Cpw near Bir Abdul Hamid Setu

Tentative dendrogram



? Showing speciation

Sponge-gourd on *Calotropis*

A live standard.

Evolution of syncarpy in cpb

3 leaves from a node

Opposite decussate is normal.

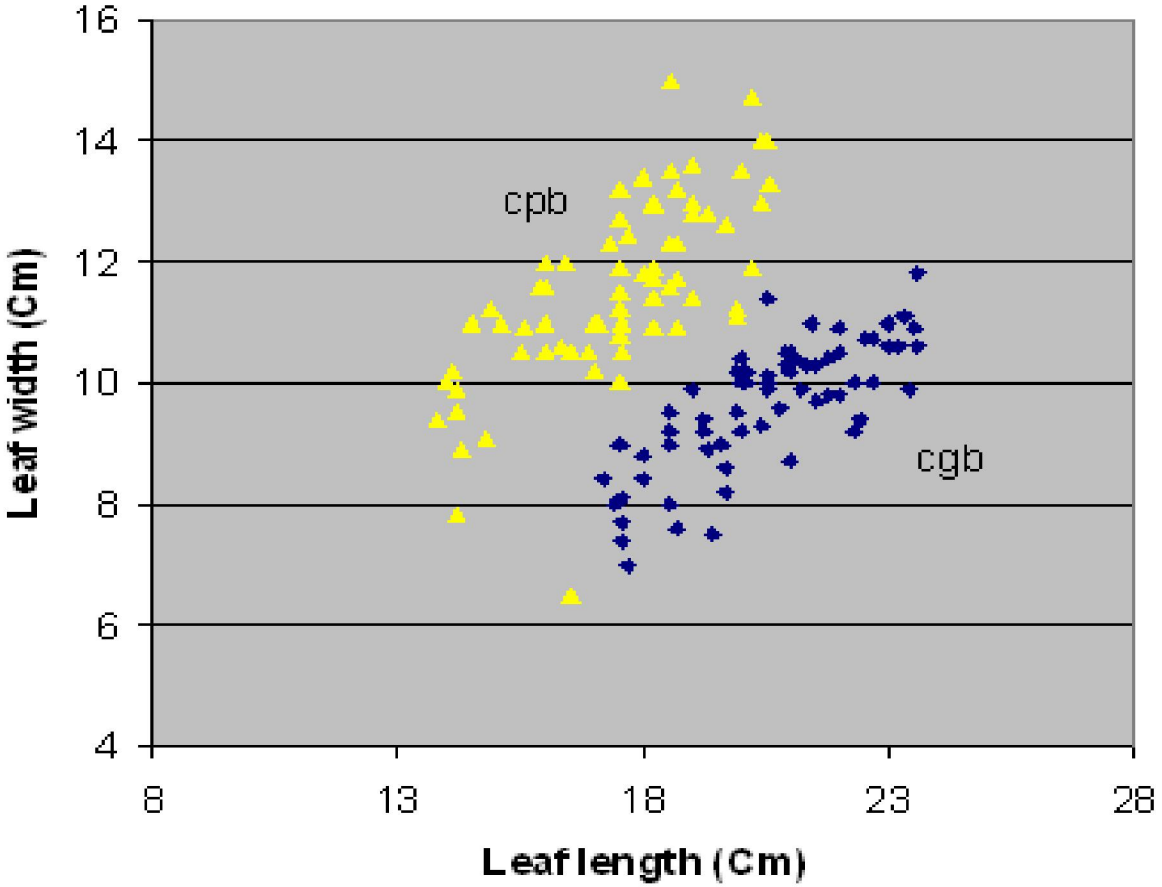
Idea of pl ht of cgw

Coppicing capacity of cgb

Idea of pl ht of cgb

Cgw on gate (auspicious)

Fuelwood for the poor



Scatter plot between leaf length and leaf width of *C. gigantea* (blue) and *C. procera* (blue)

CONCLUSIONS

- Possible comparisons between:
- 1 cgb & 2 cgw
- 1 cgb & 3 cpb
- 1 cgb & 4 cpw
- 2 cgw & 3 cpb
- 2 cgw & 4 cpw
- 3 cpb & 4 cpw

CONCLUSIONS

- Cytotypes, ecotypes or different species, cgb & cgw are suitable for multi-storey cropping.
- Cgw suitable for economic exploitation as it is considered auspicious.
- By ignoring differences, we are under-estimating our biodiversity.
- Splitter/lumper, twiddledee-dwiddledum -> plant breeding.

Terms for Floral Parts

Collective term	Term for Individual unit	Symbol in FF
Involucre of bracts	Bract	Br
Epicalyx vuqdkány iqt	Bracteole vuqdkány	Brl or Epik
Calyx okány iqt	Sepal okány	K
Corolla nyiqt	Petal ny	C
Androecium iqax	Stamen iqdsj	A
Gynoecium tk;kax	Pistil, Carpel L=hdsj] v.Mi	G
Floral formula iq"ik lw=		
Floral Diagram iq"ik vkjs[k		

bee on *gigantea*

Calotropis gigantea (white)

Calotropis gigantea (blue)

Calotropis procera from inet

Notice the openness of corolla

Calotropis gigantea

Excellent
coppicing capacity

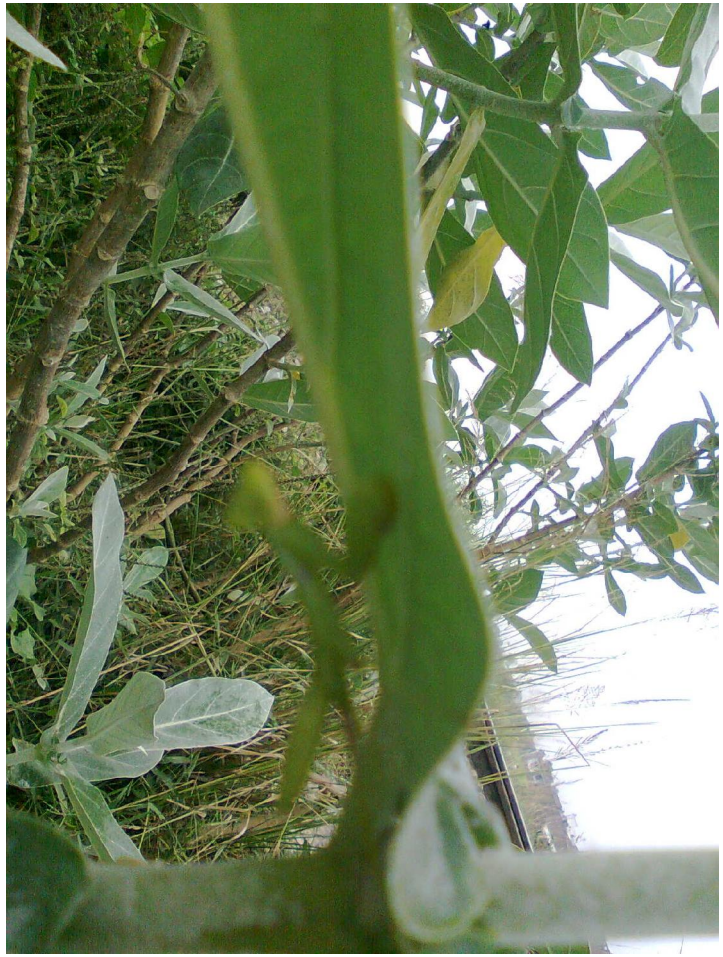
Calotropis procera

Preying mantis on *Calotropis*

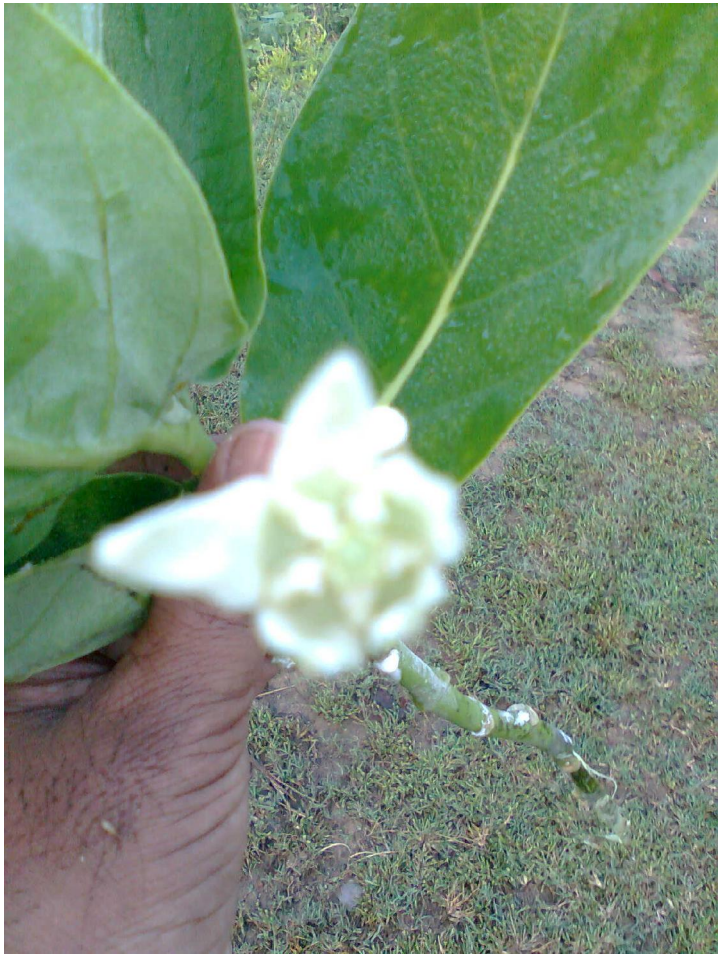
Preying mantis on *Calotropis*

Preying mantis on *Calotropis*

Preying mantis on *Calotropis*



Calotropis procera white



Calotropis gigantea blue

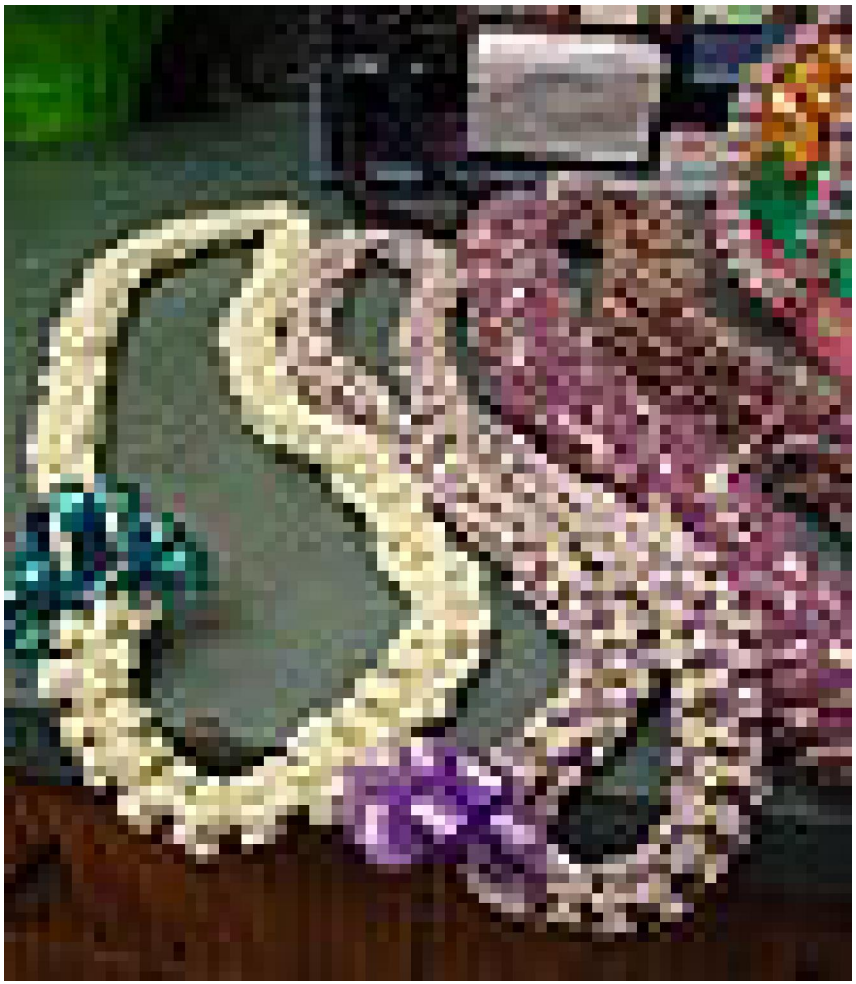
Calotropis procera (blue)

Idea of pollinator (niche) diversification

- Pollinators (insects) are species as well as tribe specific. *Calotropis procera* (Ait.) Ait. f. ssp. hamiltonii (Wight) Ali is regarded as Xylocopa blossom (Melittophilous),
- Glosscsonema varians (Stocks) Hook. f. and Oxystelma esculentum (Linn.f.) R Brown as bee and wasp blossom (Melittophilous),
- Pentatropis nivalis (Gmel.) Field and Wood, Pergularia daemia (Forssk.) Chiov. ,and Pergularia tomentosa L. as bee and moth blossom (Melittophilous and Phalaenophilous).
- Ceropegia bulbosa Roxb. as fly blossom (Myophilous) and
- Leptadenia pyrotechnica (Forssk.) Decne.as fly and beetle blossom (Myophilous and Cantharophilous).

THANKS

From inet



Garlands of *Calotropis* flowers

Calotropis procera (blue)

POLLINATION ECOLOGY OF SOME ASCLEPIADS (ASCLEPIADACEAE) FROM PAKISTAN

Pakistan Research Repository

- Login

- POLLINATION ECOLOGY OF SOME ASCLEPIADS (ASCLEPIADACEAE) FROM PAKISTAN
- Ali, Tahir (1994) POLLINATION ECOLOGY OF SOME ASCLEPIADS (ASCLEPIADACEAE)
- FROM PAKISTAN. PhD thesis, University of Karachi, Karachi.
- HTML
- 18Kb

- Abstract
- Pollination ecology of 10 Asclepiads viz. Calotropis procrea (Ait.) Ait.f. ssp. hamiltonii, Glossonema varians (Stocks) Hook.f. oxystelma esoulentum
- (Linn. f.) R. Brown, Pentatlropis nivalis (Gmel.), Field and Wood, Pergularia daemia (Forssk.) Chiov., Pergularia tomentosa L. of tribe
- Asclepiadeae and Caralluma edulis (Edgew.) Benth., Carralluma tuberoulata N.E.Brown, Ceropegia bulbosa Roxb. and Leptadenia pyrotechnica (Forssk.)
- Decne. Of tribe Ceropegieae has been carried out from Pakistan. In this connection floral phenology and morphology, location of germination locus,
- in-vitro pollinium germination, floral visitors and their pollnium load, level of pollinator activity in natural populations, mechanism of
- pollinarium removal and pollinium insertion, pollen ovule ratio and ratio of pollen grains per pollinium to ovules per carpel have been studied.
- Andromonoecy is being reported for the first time in Glossonema varians (Stocks) Hook f. and in the family. Flower life of the studied taxa is
- usually short ranges only from 1-3 days. A variety of structural adaptations have been revealed in response to the mode of pollination,
- particularly in pollinium morphology and orientation, stigmatic chamber, coronal elements, nectaries and nectar location and presentation. It has
- been demonstrated that pollinarium removal and pollinum insertion are specialized processes rather than a chance and exhibit definite
- relationship with the specialized floral modifications. Apart from presence of residual corpusculum and narrowness of stigmatic chambers.
- other three factors like closing of stigmatic chamber. presence of glandular papillae in the stigmatic chamber, and anther wings are reported
- to be responsible for the proper and successful insertion of the pollinium into the stigmatic chamber. A correlation between pollinarium removal and
- pollinium insertion exist and thus revealed that pollinium insertion rates are the positive function of removal rates. Pollinators (insects) are species as well as tribe specific. Calotropis procera (Ait.) Ait. f. ssp.
- hamiltonii (Wight) Ali is regarded as Xylocopa blossom (Meljttophilous),
- Glosscsonema varians (Stocks) Hook. f. and Oxystelma esculentum (Linn.f.) R Brown as bee and wasp blossom (Melittophilous),PentatropiS nivalis (Gmel.) Field and wood, Pergularia daemia (Forssk.) Chiov. ,and Pergularia tomentosa L. as bee and moth blossom (Melittophilous and Phalaenophilous). Ceropegia bulbosa Roxb. As fly blossom (Myophilous) and Leptadenia pyrotechnica (Forssk.) Decne.as fly and beetle blossom (Myophilous and Cantharophilous). The germination locus of the pollinium seems to be correlated with the flower structure and pollination mechanism of the species. Pollinium of each species required a specific sugar concentration for optimal germination (in vitro pollinium germination) which is more or less similar to its floral nectar sugar concentration. A relationship has also been observed between pollinium vigor (in - vitro), pollinarium