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SEED MORPHOLOGY OF SOME MEDICINAL PLANTS

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ABSTRACT:

Seed morphology of Medicinal plants of Muthugapatty, Namakkal district was studied. The mature seeds were collected from different season of the study area. The characters like, Fruit type, number of seeds per fruit, seed weight, seed sculpturing pattern, seed shape, seed colour, hilum, and modification of seeds/fruits were observed. In the study nine different types of fruits were recorded among these capsules is present in most of the species. It is observed 12 types of shapes among these ovate recorded in most of species. Sculpturing pattern like chagrenate, scabrate, echinate, fossulate, cicatricose, striate, reticulate were recorded. Seed mean weight ranges 400µg - 616mg. Hilum represents 4-position namely terminal sub terminal, lateral and basal .The importance of seed is used not only in taxonomy but also in agriculturists, botanists, and biologists to identify the species.

KEY WORD: Seed Morphology, Seed, and Medicinal plants.

INTRODUCTION:

Plant species propagate through seeds, normally they are considered easy to propagate and are very persistent because of abundance of their seed which continue to germinate and grow fast till conditions become unfavourable.

The survival of plant species depends upon its production of sufficient numbers of viable seeds to survive the hazards faced by the species in the environment. Production of abundant and small seeds is a common adaptation that ensures a high probability of dispersal and reinfestation. Seeds possess a variety of special germination mechanisms adopted of changes in temperature, soil moisture, aeration, exposure the light, depth of burial of seeds etc., when conditions are unfavourable for germination they can remain dormant are delay germination. The ability to recognize seeds, always important and has become even more essential in modern scientific world without it, there would be little merit in perfecting methods of growing plants.

METHODS:

The present investigation includes the seeds morphological studies of fully mature seeds. The seeds were collected from different seasons, and identified with help of Flora of Tamilnadu Carnatic. (Matthew, 1983-1986) and an Excursion flora of central Tamilnadu. (Matthew, 1991), Flora of the presidency of Madras. (J.S.Gamble & C.E.C. Fischer, 1921-1928) were used to identify the species.

Number of seeds per fruit: Three to five individual plants per species were chosen randomly and at least 5 fruits per plant were counted for their seeds and the average number of seeds per fruit was calculated.

Seed weight: Twenty-five seeds were weighed separately and the average weight of the seeds per fruit was calculated (10seeds in case of less material)

Seed shape and sculpturing pattern and Hilum: An Olympus photomicrograph unit at the Department of botany studied the sculpturing pattern. The surface was studied by directly transferring the seeds to a slide. (U.S.Department of agricultural office.), A.C.Martin and W.D. Barkley, 1961, Wodehouse 1935.

RESULTS:

A total of 17 families and 55 species were recorded. Among families, 16 families belong Dicot and one family belongs to Monocot. In Dicotyledons 8 families belong to Polypetalae 5 families belong to Gamopetalae and 3 families belong to Monochlamydeae. Habit wise analysis show herbs domination in the area and shrub dominate next to herb. Amaranthaceae and Fabaceae dominate with (8 species). Whereas Pedaliaceae, Sapindaceae, Sterculiaceae were least in the total number of species. Fruit such as Nutlet, utricle, achenes, capsule, pod, drupe, mericarps, schizocarps, and caryopsis were recorded in the study area. All fruits were simple dehiscent and indehiscent fruits; from above list about 9 types of fruits were revealed among this capsule recorded in 23 species. Drupe and schizocarp were least fruit types observed.

DISCUSSION:

Seed size number and weight: Herbs mean seed weight range from 2mg to 7.2mg. Shrubs mean seed weight range from 400µg to 616mg. Prostrate mean seed weight range from 1.5mg to 10.6mg. From the above results it is revealed that prostrate has more mean seed weight than herb and shrub. When the plants level at subterranean level the mean seed weight is more while the height of plants increases the mean seed weight goes on decreases it is evident from the result. The size is adopted by each species probably represents a compromise between the requirements

for dispersal which wood favours small seed and the requirements for seedling establishment which would favour large seeds. Seed size has been shown to be correlated with a number of environmental factors. The larger seeds are associated with drier habitats. The large seed and size in the plants exposed to drought is through to be due to selection in favours of seedlings which can establish an extensive root system quickly by drawing on their own food reserves. The seed number ranges from single seed to 101 seeds per fruit. More number of seeds was revealed in *Cleome viscosa* & *Corchorus*

Shape: Seed shape extremely variable such as ovate, rhomboidal, spherical, obtriangular, oblong, bean shaped, subglobose, obovate, snail, shape truncate, tetrahedral, among this ovate shape recorded in most of species. Shape of seeds depends on the form of the ovary, the condition under which the parent plant is growing during the seed formation. The other factors which determine the size and shape are the size of the embryo, the amount of endosperm presents and to what extent other tissue participates in the seed structure.

Structural Modification: Most of plant species have modifications of some kind which adapt them for dissemination by one or more of these agents special type of structural modification in the seeds and fruits which help in their dissemination from place to place. Species to avoid struggle for existence have development various devices for their wide distribution. so that some of them at least may meet favorable conditions of germination and normal growth. In the study structural modification ranges winged fruit, parachute mechanism, hooked and explosive mechanism for their dispersal of seeds. Winged fruit – *Cardiospermum halicacabum*, Parachute mechanism – *Tridax procumbens*, Hook – *Acanthospermum hispidum*, *Martynia annua*, explosive mechanism – *Ruellia tuberosa*.

Sculpturing: Seed sculpturing various from species to species and it forms important taxonomic significance. In this study 8 types of sculpturing pattern were revealed. Chagrenate, scabrate, echinate, fossulate, cicatricose striate, reticulate, corrugate among these chagrenate sculpturing pattern possess 50% of the seeds and sculpturing pattern present in nearly 20% of seeds. Seed sculpturing character play important role in species a group of species level. In species of *cordylanthus* (scrophulariaceae – Rhinanthaceae) seed sculpturing pattern furnish useful date for formulating the taxonomy position certain species-*Sisyrinchium*-Iridaceae, *Epilobium*-Onagraceae.

Seed colour: Seed surface colour range black, brownish, black, yellow, greenish, brown, reddish black, pale yellow and brown. In the study black colour reveals in 19 species. It is uncertain how much taxonomic significance to attribute to the colour variation. But in fewer studies for example

orthosanthus occissapungus has seed colour (brown seeds) an apparently significant character at the species level for identification of medicinal plants seeds.

Hilum: Hilum position indicates seed attachment to the fruit, 3 positions were revealed in the study terminal, sub terminal and lateral among this terminal position revealed in most of species and its shape mostly round.

CONCLUSION:

The external morphological characters can be used as a key for the identification of the taxa based on seed characters. The data can also be used in the construction of a key to the species. These morphological characters are helpful to identify the seeds of medicinal plants.

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Table: 1 List of seed morphology characters of some medicinal plants

S. No.	Binomial name	Vernacular name	Family	Fruit type	Seed size	Seed weight	No. of seed/ fruit	Shape
1.	<i>Acalypha Indica</i> (L.)	Kuppaimaeni	Euphorbiaceae	Capsule	0.1cm&0.1 cm	0.6mg/ Seed	3	Ovate
2.	<i>Acanthospermum hispidum</i> Dc.	-	Asteraceae	Achene	0.9cm &0.2cm	6.1mg/ Seed	1	Obtriangular
3.	<i>Achyranthes aspera</i> (L.)	Naayuruvi	Amaranthaceae	Utricle	0.2cm & 0.3cm	0.3mg/ Seed	1	Oblong
4.	<i>Aerva lanata</i> (L.) Juss.	Poolapu	Amaranthaceae	Utricle	0.6cm&0.4 cm	0.14mg/Seed d	1	Ovate
5.	<i>Alysicarpus bupleurifolius</i> (L.)Dc.	-	Fabaceae	Pod	0.3cm &0.2cm	1.55mg/ Seed	2	Rhomboid
6.	<i>Alysicarpus vaginalis</i> (L.)Dc.	-	Fabaceae	Pod terete	0.1cm &0.1cm.	2.1mg/ Seed	5	Elliptical
7.	<i>Amaranthus spinosus</i> (L.)	Mullukerai	Amaranthaceae	Utricle	0.9cm&0.8 cm	0.2mg/ Seed	1	Ovate
8.	<i>Amaranthus viridis</i> (L.)	-	Amaranthaceae	Utricle	0.8 cm&0 9 cm	0.2mg/ Seed	1	Spherical
9.	<i>Andrographis echinoides</i> Nees.	Gobura thaangi	Acanthaceae	Capsule	0.3cm & 0.19 cm	5.5mg/ Seed	4	Ovate
10.	<i>Anisomeles malabarica</i> (L.) R.Br. Exsims	Paei mirati	Lamiaceae	Nutlet	0.1cm &0.1cm	1.6mg/ Seed	4	Ovate
11.	<i>Blepharis maderaspatensis</i> (L.) Roth	Naethirapoond	Acanthaceae	Capsule	0.7cm & 0.35 cm	10.6mg/ Seed	1	Rhomboid
12.	<i>Cassia tora</i> L.	-	Caesalpinaceae	Pod	0.4cm &0.2cm	18.1mg/ Seed	24	Obovate
13.	<i>Cassia occidentalis</i> L.	-	Caesalpinaceae	Pod	0.4cm &0.3 cm	13.4mg/ Seed	35	Flattened ovate
14.	<i>Cardiospermum halicacabum</i> L.	Mudakkatha	Sapindaceae	Capsule	0.2cm &0.1cm	28.3mg/ Seed	3	Spherical
15.	<i>Celosia argentea</i> (L.)Var.	Panna keerai	Amaranthaceae	Capsule	0.1cm & 0.2 cm	0.5mg/ Seed	4	Ovate
16.	<i>Chloris barbata</i> Sw.	—	Graminae	Caryopsis	0.1 cm &0.5cm	0.1mg/ Seed	1	Obovate
17.	<i>Cleome gynandra</i> L.	Nallavaelai	Capparidaceae	Capsule	0.08 cm &0.1cm	0.5mg/per Seed	6	Snail cell like
18.	<i>Cleome viscosa</i> L.	Nallavaelai	Capparidaceae	Capsule	0.1 cm &0.2cm	0.7mg/ Seed	85 - 100	Snail cell like
19.	<i>Corchorus aestuans</i> L.	—	Tiliaceae	Capsule	0.13cm &0.1cm	0.7mg/ Seed	46	Truncate
20.	<i>Corchorus capsularis</i> L.	—	Tiliaceae	Capsule	0.1cm &0.1cm	1.1mg/ Seed	39	Ovate
21.	<i>Corchorus trilocularis</i> L.	—	Tiliaceae	Capsule	0.1cm&0.8 cm	0.6mg/ Seed	100	Truncate
22.	<i>Croton bonplandianus</i> Bailon.	Milagai poond	Euphorbiaceae	Capsule	0.3cm to 0.1cm	2.8mg/seed	3	Oblong
23.	<i>Crotalaria verucosa</i> L.	—	Fabaceae	Pod	0.4cm &0.4cm	31.1mg/Seed d	12	Bean/Kidney
24.	<i>Cuscuta reflexa</i> Roxb.	-	Convolvulaceae	Capsule	0.1cm& 0.1cm	0.8mg/Seed	4	Ovate
	<i>Digeria arvensis</i>	Thoyyakeerai	Amaranthaceae	Indehisc	0.1 cm &	1.2mg/Seed	1	Spherical

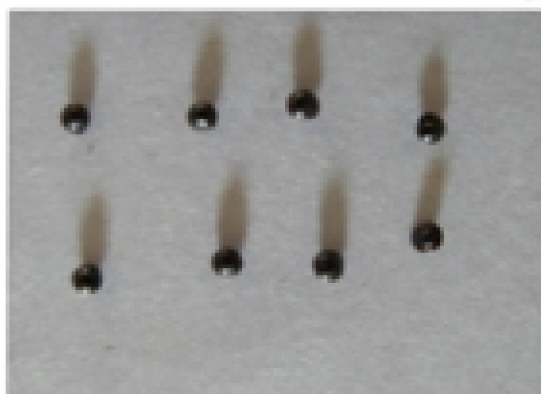
25.	Forsskal			ent Nutlet	0.2cm			
26.	<i>Eclipta prostrata</i> L.	Karaisalanganni	Asteraceae	Achene	0.2cm &0.12cm	1.2mg/Seed	46	Obtriangular
27.	<i>Euphorbia hirta</i> (L.)	Ammanpacch arici	Euphorbiaceae	Capsule	0.5cm&0 3cm	0.2mg/Seed	3	Ovate
28.	<i>Evolvulus aslsinoides</i> (L.)L.	Vishnu gerandhi	Convolvulaceae	Capsule	1cm &.1cm	0.7mg/Seed	2	Rhomboid
29.	<i>Gomphrena celosioides</i> L.Mar tius	-	Amaranthaceae	Utricle	0.1cm &0.3cm	0.4mg/Seed	1	Flattened spherical
30.	<i>Indigofera astragalina</i> Dc.	—	Fabaceae	Pod straight	0.1cm &0.1cm	2.2mg/ Seed	6	Peroblate
31.	<i>Martynia annua</i> (Hoastoun in martyn)L.	—	Pedaliaceae	Drup	0.2cm &0.6cm	431mg/ perSeed	2	Flattened ovate
32.	<i>Merremia emarginata</i> (Burm.F.)Haller f.	Elikathu kerai	Convolvulaceae	Capsule	0.2cm &0.2cm	9.6mg/Seed	1	Ovate
33.	<i>Merremia tridentata</i> (L.)Hallier f.	Muthiyar koondal	Convolvulaceae	Capsule	0.3cm &0.2cm	9.6mg/Seed	4	Rhomboid
34.	<i>Mollugo cerviana</i> (L.) Ser.Var.	Parpaadagam	Aizoaceae	Capsule	0.3cm&0.1 9cm	0.6mg/Seed	35	Rhomboid
35.	<i>Mollugo nudicaulis</i> Lam.	Parpaadagam	Aizoaceae	Capsule	0.5cm&0.6 cm	0.3mg/Seed	15 - 20	Rhomboid
36.	<i>Leucas aspera</i> (Wild.)Link	Thumbai	Lamiaceae	Nutlet	0.2cm &0.1cm	0.7mg/ Seed	3	Obtriangular
37.	<i>Ocimum canum</i> Sims	Naithulasi	Lamiaceae	Nutlet	0.1cm&0.9 cm	0.5mg/ Seed	4	Ovate
38.	<i>Ocimum tenuiflorum</i> L.	Thulasi	Lamiaceae	Nutlet	0.1cm &0.1cm	0.4mg/ Seed	1	Ovate
39.	<i>Oldenndia biflora</i> (L.)	-	Rubiaceae	Capsule	0.6cm &0.5cm	0.2mg/ Seed	2	Tetrahedral
40.	<i>Parthenium hysterophorous</i> L.	-	Asteraceae	Achene	0.2 cm &0.1cm	0.3mg/Seed	3	Ovate
41.	<i>Phyllanthus maderaspatensis</i> L.	-	Euphorbiaceae	Capsule	0.1cm &0.9cm	0.5mg/perS eed	5	Rhomboid
42.	<i>Ruellia tuberosa</i> L.	-	Acanthaceae	Capsule	0.37cm&0. 3cm	2.5mg/Seed	24	Trichomes on ventral side.
43.	<i>Rhynchosia minima</i> (L) DC.	—	Fabaceae	Pod	0.3cm &.2cm	22.4mg/ Seed	2	Subglobose
44.	<i>Sida carpinifolia</i> (L.)f.	Arivaalmunai poondu	Malvaceae	Mericar ps	0.2cm &0.1cm	2.5 mg/ Seed	1	Rhomboid
45.	<i>Sida spinosa</i> L.	—	Malvaceae	Mericar ps	0.2cm &0. cm	2.6mg/ Seed	1	Rhomboid
46.	<i>Spermacece hispida</i> L.	Natthaichchoori	Rubiaceae	Capsule	0.3 cm &0.2cm	7.2mg/ Seed	3	Oblong groove
47.	<i>Tephrosia purpurea</i> (L) Pers.	Kothukai vadai	Fabaceae	Pod	0.4cm &0.2 cm	12.1mg/ Seed	6	Bean shape
48.	<i>Tephrosia stringosa</i> (Dalz.)Santapaul.	—	Fabaceae	Pod	0.3cm &0.2cm	5.7mg/ Seed	6	Bean shape
49.	<i>Tridax procumbens</i> L.	Kinatru paasaan	Asteraceae	Achene	0.2cm &0.5 cm	0.6mg/Seed	1	Obovate

50.	<i>Vernonia cinrea</i> (L.) Less.	Seedhaevi sengalunei	Asteraceae	Achene	0.1cm & 0.5cm	0.2mg/Seed	1	Obovate
51.	<i>Vigna trilobata</i> (L.) Ver.	–	Fabaceae	Pod	0.2cm & 2 cm	8.4mg/Seed	12	Oblong
52.	<i>Waltheria indica</i> L.	–	Sterculiaceae	Capsule	0.1cm & 0.09cm	0.6mg/Seed	26	Rhomboid

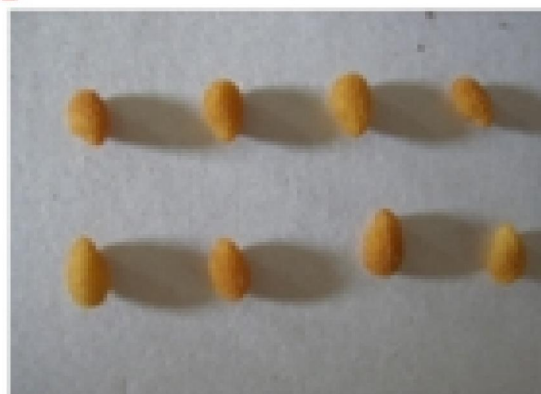
Plate - 1

*Abutilon indicum* G. Don*Acanthospermum hispidum* DC.*Blepharis madraspatensis* (L.) Roth.*Cardiospermum halicacabum* L.*Crotalaria verucosa* L.*Martynia annua* L.*Ruellia tuberosa* L.*Spermacoce hispida* L.

Plate - 2



Amaranthus viridis L.



Andrographis echinoides Nees.



Alysicarpus bupleurifolius Dc.



Chloris barbata Sw.



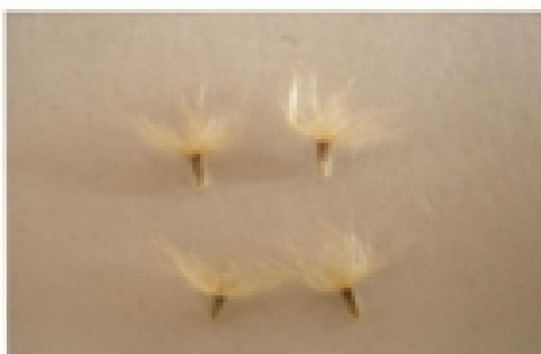
Cleome gynandra L.



Cassia occidentalis L.



Alysicarpus vaginalis Dc.



Tridax procumbens L.