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STUDIES ON REPRODUCTIVE CAPACITY IN TWO MEMBERS OF SOLANACEAE

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Average seed output is a strong parameter in calculating the reproductive capacity of any plant and deciding its fitness as a successful coloniser. Out of the two plants studied *Datura stramonium* L. shows greater value of reproductive capacity than *Withania somnifera* Dun.

Keywords: Average seed output; Colonisation; *Datura stramonium* L; Reproductive capacity; *Withania somnifera* Dun.

Colonisation and subsequent success is quiet often a critical stage in the life history of herbaceous plants[1]. For a plant to be a successful coloniser, its reproductive capacity is a major parameter which is calculated by average seed output and seed germination percentage.

The number of seeds produced by a plant gives a rough estimation of its potentialities for increase and it also show the amount of energy passed by a species to the next generation.

With this view, we have selected two members of the Family Solanaceae *i.e. D. stramonium* and *W. somnifera.* Both of these plants flourish on roadsides and openland in the suburban areas of Jaipur, *i.e.,* Mansarovar, Vaishali Nagar and Sanganer etc.

The life history of both of these plants starts from early winters (November) and they flourish to cover the ground till onset of premonsoon (June).They anchor the top soil and prevent soil erosion for maximum time in a year.

D.stramonium commonly called Jimson Weed or Thorn Apple is considered a weed in some countries like Canada[2] but in Mexico it is considered as a colonising (ruderal) plant which is most commonly encountered in disturbed habitats. It is a tall herb with one to three feet height with trumpet shaped white flowers. The fruits are four chambered with dozens of black seeds. Mythologically, *D. stramonium* has described that its leaves and fruits are offered on Shivratri to Lord Shiva. The seeds and fruits have medicinal value when consumed in limited quantity[3].

W. somnifera commonly called as Ashwagandha is a highly branched shrub. Fruits are red orange berries with large number of seeds. Its roots are medicinally used as sedative, rejuvenating agent, muscle toner and to control premature ageing etc[4].

Data of number of fruits per plant and number of seeds per fruit of the two selected plants *D. stramonium and W. somnifera* were collected from suburban areas of Jaipur. Frequent field visits were done to cover the maximum areas for specimens of two species.

Number of fruits per plant was recorded in field. For number of seeds per fruit, 100 fruits were randomly collected in separate bags at proper time *i.e.* before their seed dispersal. The number of seeds is very high in both the species and hence the mean value has taken for seed output[5-6].

The average seed output= No. of seeds per fruit (mean) x No. of fruits per plant (mean)
±standard error of means.

For seed germination experiments seeds were thoroughly washed and then soaked for 24 hours in distilled water[7]. Ten seeds of each species with three replicates were placed in Petri plates and kept wet for 10-12 days. Germinated seeds were counted to calculate the reproductive capacity.

$$\text{Reproductive Capacity} = \frac{\text{Average seed output} \times \text{Average seed germination \%}}{100}$$

Seed germination starts after nine days in *W. somnifera* whereas in *D. stramonium* it takes only five days. The weight of seeds of *W. somnifera* is 0.529g /100 seeds whereas 2.504g/100 seeds of *D. stramonium.* Lighter seeds have longer dormancy period than the heavier ones[8]. Average seed output and seed germination percentage of the two selected species *i.e., W. somnifera* and *D. stramonium* are given in Table1. The mean of fruits per plant was 58.08 in *W. somnifera* and 6.9 in *D. stramonium.*

Table1. Showing data on average seed output and reproductive capacity of two species of Solanaceae.

Name of Plant	Number of fruits/plant mean±SD	Number of seeds/fruit mean ±SD	Average seed output mean ±SD	Seed Germination (%)	Reproductive Capacity
Withania somnifera	58.08± 20.60	34.24±9.29	1988.65±16.8	56.66	1126.77
Datura stramonium	6.9± 4.64	434.62±110	2998.87±302.44	76.66	2298.93

where SD=Standard deviation

W. somnifera produced 34.24 numbers of seeds per fruit, out of which 56.66% seeds were germinated in laboratory conditions, hence, its reproductive capacity is 1126.77. On the other hand *D. stramonium* produced 434.62 numbers of seeds per fruit and germination percentage was 76.66% hence, its reproductive capacity is 2298.87. More successful species are those which exhibit a higher seed output and germination capacity. According to 64 hours observations, *D. stramonium* is more successful colonising species if compared with *W. somnifera*[9].

Seed number turnover (SNT) coloniser plant with larger seeds have a higher probability of successful establishment than smaller seeded species. The seeds of *D. stramonium* have larger size shows successful establishment as coloniser when compared to *W. somnifera* where the seeds are smaller[10-11]. Werner and Platt[12] observed relationship between size and seed number in *Solidago*. Smaller seeds have better chance to enter the soil than the bigger ones. This statement is contradictory to our observation[13].

The present study reveals that out of the two selected plants high reproductive capacity is found in *D. stramonium* than *W. somnifera*. Hence, *D. stramonium* can be used as an alternative vegetation to cover the bare soil of roadside areas which prevents erosion of top soil and reduce dust storm.

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