

## Short Communication

## Seed Characteristics and Growth Patterns of Seedlings in Some Trees of Indian Arid Zone

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Ecophysiological study of seed germination is fundamental for understanding the growth and development of a plant species under a set of environmental conditions (Sen, 1979). A high correlation exists between the environmental conditions of a particular habitat and the successful germination in a particular seed (Sen, 1977).

Langer (1979) described the germination process in terms of morphological and biochemical events. As plants in a population grow in size, the variability among them, measured in absolute units, tends to increase, but it is often found to bear a constant proportion to plant size. Therefore, the variance of the logarithm of measured quantities, such as plant dry weight, is expected to be roughly constant over a period of time. In the present study, an attempt has been made to investigate seed behaviour and growth pattern of seedlings of some adapted and economically important desert plants.

Seeds of *Prosopis cineraria*, *Azadirachta indica*, *Acacia tortilis* and *Mimosa hamata* were collected from Central Arid Zone Research Institute

Table 1. Seed characteristics of some trees and shrubs

Species	Wt. of 10 seeds (g)	Seed length (cm)	Seed breadth (cm)	Colour	Shape
<i>A. senegal</i>					
(a) From Mandore	0.853±0.42	0.96±0.05	0.81±0.12	Shining brown	Circular flat
(b) From Kailana	0.772±0.04	0.83±0.11	0.72±0.11	Dull grey brown	-do-
(c) From Shergarh	1.138±0.07	0.95±0.10	0.91±0.11	Greenish brown	-do-
<i>A. tortilis</i>	0.642±0.05	0.57±0.04	0.51±0.05	Brownish black	Oblong (with depression)
<i>A. indica</i>	2.765±0.37	1.30±0.12	0.68±0.22	Creamish	Conical
<i>P. cineraria</i>	0.380±0.01	0.59±0.07	0.44±0.06	Dark brown	Elliptical to oval flat
<i>M. hamata</i>	0.315±0.01	0.45±0.05	0.35±0.05	Brown	Circular flat

(CAZRI), Jodhpur, and those of *Acacia senegal* from Mandore and Kailana near Jodhpur and Shergarh, about 90 km to the west of Jodhpur. The colour of the seed coat, the differences in mottling and the shape were recorded. Weight of 10 seeds was separately recorded.

Seedlings were raised in pots at the botanical garden, JNV University, Jodhpur. Relative growth rate (RGR), net assimilation rate (NAR) and leaf area ratio (LAR) were calculated for the seedlings employing the functions of Evans (1972). Seeds of *A. senegal* from the three sites were compared to find out the variability between the sites, while species variation was studied in the remaining four species collected from CAZRI, Jodhpur.

In *A. senegal*, seed coat colour ranged from shining brown to dull grey and greenish brown. The seeds were flat and circular, having a depression-like C on them. The seed length ranged from 0.83 to 0.96 cm and breadth from 0.72 to 0.91 cm. The weight of 10 seeds from Shergarh

Table 2. RGR, NAR and LAR in different species

Species	Days	RGR (g g <sup>-1</sup> day <sup>-1</sup> )	NAR (g cm <sup>-2</sup> day <sup>-1</sup> )	LAR (cm <sup>2</sup> g <sup>-1</sup> )
<i>A. tortilis</i>	15	0.012	0.920	0.022
	30	0.004	3.600	0.025
<i>A. senegal</i>				
Kailana	15	0.005	0.240	0.018
	30	0.008	0.380	0.032
Mandore	15	0.009	0.052	0.004
	30	0.011	0.760	0.014
Shergarh	15	0.003	0.830	0.0002
	30	0.017	1.130	0.004
<i>A. indica</i>	15	0.076	2.577	0.001
	30	0.006	4.810	0.008
<i>P. cineraria</i>	15	0.011	0.160	0.006
	30	0.001	0.219	0.025
<i>M. hamata</i>	15	0.009	0.320	0.018
	30	0.006	0.458	0.024

was comparatively more than that of the seeds from Kailana (Table 1).

RGR was generally higher in 15-day-old seedlings, except in *A. senegal*, in which 30-day-old seedlings showed more RGR. *A. indica* showed maximum RGR (15-day-old). 30-day-old seedlings of *A. senegal* from Shergarh showed maximum RGR, while the minimum was in *P. cineraria*.

Overall NAR was higher in all the 30-day-old seedlings. Among 15-day-old seedlings, maximum NAR was recorded in *A. indica*, while minimum was in *A. senegal* from Mandore. Among 30-day-old seedlings, NAR was maximum in *A. indica* and minimum in *P. cineraria*. LAR increased with age. Among the species, maximum LAR was recorded in *A. tortilis* in 15-day-old seedlings, while minimum in *A. senegal* from Shergarh. In 30-day-old seedlings, it was maximum in *A. senegal* from Shergarh and minimum in *A. indica* (Table 2).

The nature of many germination regulating mechanisms in seeds lends itself to an interpretation, in terms of survival value of a species. The significance of seed size, shape and weight of a particular species lies in exhibiting polymorphic or dimorphic conditions, especially in arid conditions. Seed weight is also responsible for the dispersal mechanism of the plants to a large extent. Seed size and weight, besides other morphological and physiological factors, are known to be related with germination and seedling vigour (Roberts, 1972).

In some cases, RGR was higher in 15-day-old seedlings, while in others, it was higher in 30-day-old seedlings. RGR provides a valuable overall index of plant growth. NAR and LAR increased with time. Seedlings of *A. indica* showed overall healthy growth. In general, heavier seeds showed higher value of RGR and NAR as in *A. senegal* (Shergarh) and *A. indica*. Usually fluctuating condition of growth in the field influence the seedling growth, leading to a variability in the population and growth rates.

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