

## Original Research Article

# Germination responses of seeds of *Desmodium triflorum*

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### ABSTRACT

**Background:** Germination of *Desmodium triflorum* is used for the scarification using the acid is valuable for the different light condition.

**Methods:** The sample was collected as four month of interval of time and the seed is treated with acids with different time.

**Results:** seeds scarified with sulfuric acids for 10 min before sowing had better germination than those scarified for 5 and 15 min. Among them light qualities, red and white light had slightly promoted effect whereas blue light and dark condition had slightly negative effect on seed germination.

**Conclusions:** In comparison to blue light and dark condition, red light and white light were promoted to percentage germination indicating the role of phytochrome in seed germination of *Desmodium triflorum*.

**Keywords:** Concentration, *Desmodium triflorum*, Light, Phytochrome, Scarification, Seed germination

### INTRODUCTION

Percentage germination increased with the increase in duration of acid scarification and maximum germination (73%) was recorded after 60 min acid scarification after four days.<sup>1</sup> Seeds required a shorter acid scarification period and hundred percent germination was obtained after 10 min pretreatment on third day in seeds stored for one year. In seeds stored for 4 and 11 years, hundred percent germination was obtained after 30 and 40 min pretreatment, respectively. These findings indicate that the dormancy is removed to a certain extent after one year storage and again enforced when stored for four or more years.

The seeds of some range grasses (*Bothriochloa intermedia*, *B. pertusa*, *Cenchrus ciliaris*, *C. setigerus*, *Chrysopogan fulvus*, *Dichanthium annulatum*, *Heteropogon contortus*, *Panicum antidotale* and *Sehima*

*nervosum*) stored in polythene bags at ordinary conditions retained viability for at least 48 months from the date of seed collection.<sup>2</sup> Dhakal and Pandey have reported germination behavior, viability and longevity of Niger seeds stored in screw capped plastic containers under ambient conditions. The germination percentage of Niger seeds was negligible immediately after harvest but improved up to 80 to 100% after storage for nine months.<sup>3</sup> Thereafter, the germination percentage sharply declined and the viability was completely lost after 16 months of storage.

Scarified the seeds of *Desmodium triflorum* with concentrated sulphuric acid for 1 to 15 min, and kept for germination after through washing. The acid treatments had promotive effect on germination since 20, 28, 44, 68 and 50% germination was obtained for seeds treated for 1, 2, 5, 9 and 15 min, respectively. Non – scarified seeds gave only 12% germination.<sup>4</sup>

Effect of scarification by sulphuric acid on seed germination of four leguminous weeds (*Aeschynomene indica*, *Cassia floribunda*, *Trifolium repens* and *Vicia hirsuta*).<sup>5</sup> Raut studied germination behavior of seeds of seven common weeds.<sup>6</sup> More than 90% germination in 9 months old seeds of *Solanum khasiana* when treated with 10% nitric acid for 15 min (germination was 15% in control).<sup>7</sup>

Germination behavior of seeds of *Sesbania rostrata* and recorded 40, 80, 100 and 93% germination, respectively when seeds were treated with sulphuric acid for 15, 30, 45 and 60 min.<sup>8</sup> Maximum germination under white and red light, whereas yellow, blue and green spectra had inhibitory effect on seed germination of *Indigofera astragalina* Blue and green spectra inhibited whereas red light promoted seed germination and seedling growth of sugar beet.<sup>9,10</sup>

Seeds of *Veronica anagallis-aquatica* and *V. javanica* which form persistent soil seed bank require light with relatively high red/far-red ratio and alternating temperatures for better germination.<sup>11,12</sup> The main objective of the study is germination responses of the seeds of *Desmodium triflorum*.

## METHODS

Seeds of *Desmodium triflorum* were collected from a single population occurring. Germination was evaluated in September in petridishes (5.5 cm dia) on filter paper saturated with distilled water. Moisture was maintained by daily monitoring with distilled water added as needed,

and germination was defined as radicle emergence. All sets of treatment and control contained 5 replicates, each of 20 seeds. The petridishes were placed on a table in laboratory at room temperature which, in addition to diffuse light entering the laboratory through glass windows from dawn to dusk, received light for 6 hardly from a 35W fluorescent tube fixed in the laboratory ceiling. Seeds in light were inspected daily and the germinated seeds were counted and discarded, whereas those incubated in dark were root inspected until germination under light became static. The average daily maximum and minimum temperatures during the experiment were 33 degree centigrade and 24 degree centigrade. Seeds of *Desmodium triflorum* responded poorly to soaking in water alone for germination they were treated with concentrated sulphuric acid to see if the seed covering was hampering imbibition's and germination of seeds. The seeds were treated with acid for 5, 10 and 15 min after which they were rinsed under running water for 5 min to remove the acid, and sown.

For the study of germination response of seeds to different light qualities, petridishes were covered by red and blue cellophane papers separately. Seeds were also incubated under white light as well as in complete darkness by covering the petridishes with black carbon sheets.

## RESULTS

Length and breadth of *Desmodium triflorum* seeds was 0.36 and 0.29 mm, respectively, whereas weight of 1000 air dried seeds was 1.61 g.

**Table 1: Effect of various durations of acid scarification and different colors of light on percentage of germination.**

| Treatment | Days after sowing |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----------|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|           | 4                 |    |    | 5  |    |    | 6  |    |    | 7  |    |    | 8  |    |    |
|           | W                 | B  | R  | W  | B  | R  | W  | B  | R  | W  | B  | R  | W  | B  | R  |
| T0        | 0                 | 0  | 0  | 3  | 9  | 2  | 7  | 16 | 21 | 17 | 23 | 21 | 22 | 24 | 17 |
| T5        | 9                 | 6  | 11 | 14 | 16 | 8  | 19 | 34 | 42 | 33 | 44 | 42 | 36 | 41 | 38 |
| T10       | 21                | 20 | 27 | 38 | 50 | 31 | 52 | 77 | 74 | 64 | 84 | 81 | 71 | 86 | 74 |
| T15       | 21                | 17 | 26 | 31 | 35 | 21 | 49 | 64 | 64 | 49 | 64 | 64 | 59 | 66 | 54 |

Durations for acid scarification; T15:15 min, T10:10 min, T5:5 min, T0: no scarification; W: white light, B: blue light, R: red light, D: dark condition.

In general, 6-8 month old seeds of *Desmodium triflorum* sown without acid scarification had poor germination than those scarified with concentrated sulphuric acid for 5, 10 and 15 min. Further seeds scarified with sulphuric acid for 10 min before sowing had better germination than those scarified for 5 and 15 min. Among the light qualities, red and white light had slightly promotive effect whereas blue light and dark condition had slightly negative effect on seed germination.

## DISCUSSION

Valuable in evaluation and management of *Desmodium triflorum* of the middle land pastures in Nepal was.<sup>13</sup> The

reported seed output in *Desmodium triflorum* is large.<sup>14</sup> Further, the amount of chlorophyll that covers the embryo as the seed ripens is especially important in determining whether or not seeds of a given species will be photodormant.<sup>14</sup> It also reproduces vegetatively during moist and warm seasons. Shiew et al, Shiew et al have opined that the more successful species are those which exhibit a large seed output as well as capacity of vegetative propagation.<sup>15</sup> The seed size of *Desmodium triflorum* was small which is feature of species that form persistent seed banks.<sup>16</sup> The 7-9 month old seeds without acid scarification exhibited lower percentage germination than those scarified by sulphuric acid for 5, 10, and 15 min which indicate that seed coat inhibits germination in

*Desmodium triflorum* seeds. In general, embryo that are covered during ripening by maternal tissues that contain high amount of chlorophyll require light to germinate, which was also the case with *Desmodium triflorum* seeds. In comparison to blue light and dark condition, red light and white light were promotive to percentage germination indicating the role of phytochrome in seed germination of *Desmodium triflorum*. Most of the seeds germinated in the last week of June. Vegetative growth in *Desmodium triflorum* occurred between March and September. The plant flowered from September to April.

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