



## Germination and Reproductive Capacity of *Carthamus Tinctorius L.*

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**Abstract:** The study deals with germination and reproductive capacity of two varieties i.e. PBNS-12 and PBNS-40 of *Carthamus tinctorius L.* The percentage germination was found to be 95.25% PBNS-12 and 93.89% PBNS-40 and also reproductive capacity of variety PBNS-12 was superior to PBNS-40 due to high reproductive capacity.

**Keywords:** *Carthamus tinctorius L.*, PBNS-12, Germination.

### I. INTRODUCTION

Germination constitutes an important phase in the life cycle of a plant by which the dormant embryo wakes up, grows out of the seed coat and establishes itself as a seedling. The most crucial factor in determining germination of seeds in the soil is a suitable combination of temperature, pH and moisture. The length of time and conditions of storage of seeds after harvest strongly affect germination. Physiology of seed germination has been reported by Kollar (1955), Toole *et al.* (1956), Cumming (1963), Ki Pandeya *et al.* (1968), Datta and Biswas (1970), Chawan (1971), Dubey and Mall (1972), Mahindra (1979), Sinha (1982), Datta and Sen (1982, 1983), Jhamb and Sen (1984), Dwivedi (1986, 1987), Datta and Ghosh (1987), Dongra and Elecy (1989), Gupta (1989), Kumar (2007), Prashant (2008), Kumari and Trivedi (2009), Raghavendra *et al.* (2010).

### II. MATERIAL AND METHODS

The seeds of PBNS-12 and PBNS-40 were collected from All India Co-ordinated Research Project on Safflower, Department of Agricultural Botany, Marathwada Agricultural University Parbhani-431 402 (M.S.), India.

### III. REPRODUCTIVE CAPACITY

It was calculated as method suggested by Salisbury (1942).

$$\text{Reproductive Capacity} = \frac{\text{Seed output/plant} \times 100}{\% \text{ germination}}$$

### IV. GERMINATION

This study was made in the laboratory of P.G. Department of Botany, Nalanda College, Biharsharif. 50 seeds were placed on Whatman's filter paper no. 1 in a petridish. 5 ml of double distilled water was used as germinating medium. 5 ml. of treatment solution was used in case of pH. Buffer solution of pH values were prepared as method suggested by Pandeya *et al.* (1968).

High and low temperature incubators were used for the study of temperature effect on germination. The percentage germination for a period of 20 days was taken as final reading.

### V. RESULTS AND DISCUSSION

Freshly harvested seeds when placed in between moist filter paper, germinated within 48 hrs .The percentage germination was found to be 95.25%PBNS-12 and 93.89% PBNS-40. Seed output and reproductive capacity Of VarietyPBNS–12was superior toPBNS–40due to its high reproductive capacity. The seed output by varietyPBNS-12was found to be 5327 seeds/plant where as it was 2237 seeds/plant in PBNS- 40 in almost uniform cultural conditions the difference of seed output in two varieties may be due to their inherent potentials . Since all the two varieties were grown in almost uniform cultural conditions the difference of seed output in two varieties may be due to their inherent potentials .The most crucial factor in determining seed germination is a suitable combination of temperature, pH and moisture. The most suitable pH range for germination was found to be between 7 and 8.2 and The most suitable temperature range for germination was found to be between 15<sup>0</sup>C and 25<sup>0</sup>C. An increase in temperature between 5<sup>0</sup>C and 25<sup>0</sup>C increase in percentage Of germination due to increase in metabolic activity.

Seed output and reproductive capacity of *Carthamus tinctorius* Linn. in monoculture.

Characters	Cultivars	
	PBNS–12	PBNS–40
Number of capitulum/plant +	135.80 ±1.29	82.49 ±0.96
Number of seeds/capitulum ++	39.23 ±1.30	27.12 ±0.65
Seed out put/plant	5327	2237
Germination (%)	95.25	93.89
Reproductive capacity	5592.65	2383.08
Dormancy	NIL	NIL
+Average of 10 plants .                      ... ++ Average of 100 capitula		

Germination at different pH

Cultivars	pH value						
	4.2	5.2	6.2	7.0	8.2	9.20	10.20
PBNS–12 % Germination	NIL	45.93 ±2.81	72.59 ±2.91	93.22 ±3.61	86.41 ±2.55	75.55 ±3.01	60.77 ±1.78
Average time taken in radicle emergence (day)		6.85 ±0.24	3.50 ±0.15	2.31 ±0.10	2.31 ±0.09	3.50 ±0.14	5.87 ±0.16
PBNS–40 % Germination	NIL	40.99 ±2.17	71.60 ±3.50	92.33 ±4.91	84.05 ±3.57	73.19 ±3.43	58.77 ±3.05
Average time taken in radicle emergence (day)	NIL	6.66 ±0.39	3.50 ±0.17	2.31 ±0.13	2.81 ±0.10	4.39 ±0.16	6.76 ±0.43



Germination at different temperature.

Cultivars	Temperature °C							
	5	10	15	20	25	30	35	40
PBNS-12 Germination (%)	29.35 ±1.44	75.67 ±2.17	84.47 ±3.25	90.33 ±2.40	89.36 ±4.99	78.32 ±2.98	61.04 ±3.03	4.05 ±0.11
Average time taken in radicle emergence (day)	16.05 ±0.73	12.49 ±0.35	5.31 ±0.14	4.44 ±0.19	4.34 ±0.14	4.05 ±0.09	4.63 ±0.19	4.73 ±0.09
PBNS-40 Germination (%)	28.93 ±0.92	74.71 ±0.95	83.49 ±3.25	89.93 ±2.74	88.27 ±2.93	76.90 ±0.98	59.04 ±1.88	4.01 ±0.13
Average time taken in radicle emergence (day)	16.44 ±0.70	13.32 ±0.42	5.51 ±0.13	4.34 ±0.14	4.53 ±0.15	4.25 ±0.10	5.12 ±0.12	5.31 ±0.11

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