International Journal of Applied and Universal Research E- ISSN No: 2395-0269
Volume VII, Issue I, February 2020 Available online at: www.ijaur.com

STUDIES OF THE SEED GERMNATION OF SOME PLANT SPECIES OF ACANTHACEAE FAMILY

Prakash Chandra Patel and Rajendra Prasad Verma
Department of Botany, Govt. Arts & Commerce College Jaisingh Nagar, Shahdol (M.P.)

ABSTRACT:- Both plants seeds show dormancy studies were conducted to break the dormancy of seed by various physical treatments. Among the physical treatment sand pounding, temperature, Treatment, light, X-ray ultraviolet and infrared treatment was given, temperature, and light has shown some positive result whereas ultraviolet and infrared show inhibitory effect. X-ray treatment showed positive effect on *P. bicalyculata*. Electric shock was given to the seed to see the change in germination percentage, it was favorable in case of *P. bicalyculata* but not on *A. vasica*.

KEYWORDS:-Seed Germination and Acanthaceae.

INTRODUCTION:-

Seeds are the first link in the food chain to retain the life of plant on earth through there viability and nutritive value for 5000 years, there is always a content effort from formers, researchers, and scientist all over the world to produce good quality seeds. The seed germinates, studies was done from a variety of angles. A number of factors appear to influence the process of germination different type of dormancies, occurrence of ecotypes, permeability levels of the seed coat, drought resistance mechanism, polymorphism, differential precipitation of light and temperature have attracted the attention of researchers for germination studies mechanism, in seeds germination represents the commencement of subsequent growth phase.

During these days germination and dormancy of several plants have been studied by Amen (1963-1968), Vagis (1964), Wareing (1965), Bhat (1968), Chatterji (1975), Shukla (1977), Dubey (1987), and Salgane et al., 1990, Rajamanickam et al., (2002) Ratan & Reddy (2004), Dhoran & Gudadhe (2012).

MATERIAL AND METHODS:-

Seed Germination: The method used for growing seedlings was followed as Frankland and Wareing (1960) for Lettuce. The seeds of *Peristrophe bicalyculata* and *Adhatoda vasica* of average. Uniform size were selected, disinfected and thoroughly washed were soaked in distil water over a moisture filter paper in pertidishes. Each petridishes was containing 8 ml of distil water and 50 seeds.

Methods of breaking dormancy: Various physical treatments were given to break the dormancy following methods are-

(A). Mechanical scarification: The seeds were stratified in pestle and motor along with the sand and washed seeds were set for germination.

(B). Temperature treatment: Socked seeds were treated with different temperature from 20-40°C in incubator for the desired period and low temperature in Refrigetor was given

(C). **Treatment for different light intensities:** Soaked seeds under electric lamp in desired intensity. Effect of alternate light and dark period studies in dark-room for desired period.

(D). **Treatment** with different wavelength of light 60 watt electric lamp was warped with red or blue cellophane paper in dark- room.

(E). **Treatment with different radiation:** Ultra-violate and infrared radiation were provided with respective lamps in dark room. X-ray treatment was given to dry and soaked seeds for different duration in a local X-ray clinic.

(F). **Treatment with electric shock:** Seeds were put acidified water full beaker and electric shock was given for different duration.

RESULT AND DISCUSSION:

Various physical treatment given in table.1,2,3,4,5,6&7

Table.1 - Effect of sand Pounding in *P. bicalyculata* & *A. vasica*

Sr. No.	No. of seed given treatment	No. of seed germination		Time in days requirement for seed germination		% germination	
		P.b.	***A.v.***	***P.b.***	***A.v.***	***P.b.***	***A.v.***
1.	50	10	_	1	1	20±1	Nil
2.	50	30	_	5	5	60±2	Nil
3.	50	40	2	10	10	80±3	4
4.	50	42	4	15	15	84±3	8
5.	50	42	4	20	20	84±2	8
6.	50	35	28	control	control	70	56

Table.2 - Effect of different temperature

Sr. No.	Different temperature	No. of seeds given temp. treatment	No. of seed germination		% germination
			P.b.	***A.v.***	***P.b.***	***A.v.***
1.	10^0	50	10	8	20±2	16±2
2.	20^0	50	25	16	50±3	32±2
3.	30^0	50	35	28	70±3	56±1
4.	35^0	50	47	30	94±2	60±2
5.	40^0	50	30	34	60±2	68±2
6.	45^0	50	25	30	50±2	60±1
7.	50^0	50	10	16	20±1	32±2
8.	30^0 control	50	35	28	70	56

Table.3 - Effect of Alternate low and high temperature

Sr. No.	Time in hours given treatment	No. of seeds given	No. of seed germination		% germination	
			P.b.	***A.v.***	***P.b.***	***A.v.***
1.	12	50	45	36	90±3	72±3
2.	24	50	18	30	36±2	60±2
3.	48	50	0	20	0±0	40±2
4.	control	50	35	28	70	56

Table.4 - Effect of different light intensities

Sr.No.	Different light intensities in Lux	No.of seed given treatment	No.of sed germination		% germination	
			P.b.	***A.v.***	***P.b.***	***A.v.***
1.	0	50	49	26	98±2	52±2
2.	50	50	47	30	94±3	60±3
3.	100	50	47	26	94±3	52±2
4.	200	50	47	10	94±2	40±2

5.	300	50	47	6	94±3	24±1
6.	control	50	35	14	70	56

Table.5 - Effect of Alternate Light and dark period on seed germination

Sr. No.	Dark period hours	Light period hours	max. days required for germination		Mean % germination	
			A.v.	***P.b.***	***A.v.***	***P.b.***
1.	6	6	8	5	8.3±2	20±1
2.	12	12	7	6	50.0±2	53±2
3.	18	18	6	5	62.5±3	83±1
4.	24	24	5	2	62.5±4	96±1
5.	30	30	6	2	45.0±2	98±3
6.	36	36	5	3	50.0±1	90±4
7.	42	42	7	3	30.0±2	92±3
8.	48	48	6	4	30.0±1	90±2

Table.6 - Effect of Red and blue Light

PP	Time in hours	No. of seeds given treatment	Red Light				Blue Light			
			No. of seed germination		% seed germination		No. of seed germination		% germination	
			A.v.	***P.b.***	***A.v.***	***P.b.***	***A.v.***	***P.b.***	***A.v.***	***P.b.***
1.	0.5	50	22	35	44±2	70±3	22	34	44±2	68±3
2.	1	50	20	32	40±2	64±3	20	34	40±3	68±2
3.	2	50	4	10	8±1	20±2	10	27	20±2	54±2
4.	3	50	0	3	0±0	6±1	0	11	0±0	22±
5.	control	50	28	35	56	70	28	35	56	70

Table: 7- Effect of ultra violet rays, infrared, X-rays and electric shock

S. No.	Time of treatment in minutes	No. of sed given treatment	Mean% germination							
			Ultra violet rays		Infera red		×- ray		Electric shock	
			A.v.	***P.b.***	***A.v.***	***P.b.***	***A.v.***	***P.b.***	***A.v.***	***P.b.***
1.	1	50	48±2	60±2	56±3	64±3	56±2	80±2	56±2	96±2
2.	3	50	40±2	46±2	40±2	52±2	44±2	90±3	32±1	92±3
3.	5	50	20±1	20±1	20±2	40±1	32±1	70±2	20±1	80±2
4.	7	50	4±1	0±0	40±1	20±1	28±1	60±1	8±0	50±1
5.	9	50	0±0	0±0	0±0	0±0	20±1	50±1	4±1	16±1
6.	control	50	56	70	56	70	36	70	56	70

Symble-*A.v =Adhatoda vasica P.b. =Peristrophe bicalyculata*

The seed of P. bicalyculata and Adhatoda vasica show dormancy. It was conformad by germinating seeds of both plants. Seed coat dormancy was studied by different Authors Bharadwas 1990 in Tephrosia hemiltoni ,Chatterji(1975) observed increased percentage of germination in Abutilon indicum by sand pounding there in increase in percentage germination in P. bicalyculata with this treatment where as it reduces in A. vasica this confirm the earlier work of Singhal (1990) an Ameranthus and Indigofera.

Temperature plays important role in germination of seeds (Vegis 1964 a, b 1965). A lot of work has also been done by a number if excellent worker on the subject of effect of temperature on seed germination as Colligonum polygonodes (Bisnoi & Gautam 1990)Purtalaca sp. Chaudhary & Sinha 1990), Tephrosia strigasa (Khan & Bharadwaj 1990), Hypoxes aurea (Dubey 1987), A butilon indicum (Chatterji 1975).In present study the plant P. bicalyculata show maximum germination on 45℃ over control while in case of A. vasica seed maximum was seen of 40℃ both the plants show negative response two wards higher temperature. It seem that increased respiration and enzyme activities as well as chemical changes is the embryo and endosperm.

Pandey et al., (1968) mentioned that alternate low and high temperature increases the percentage germination of certain seeds. In the present study P. bicalyculata is 7℃ & 50℃ low & high temperature show maximum 90% germination under 12 hours treatment. Whereas in case of A. vasica show maximum 72% germination.

Light has pronounced effect on germination for photoblastic seeds may be positively or negatively. photoblastic. Different photoblastic seeds require different quantum of light for germination Artemsria menospertium needs 24 Lux for high germination Kollar (1962)Anagallis arvensis required 120 Lux (Pandeya 1969)Present study reveals that light intensity 50 Lux stimulates the germination percentage in case of P. bicalyculata but in A. vasica the light intensity up to 50 Lux has negative effect.

Effect of alternate light and dark period on seed germination has been studied by various authors Dubey (1987) Vyas (1981) Saxena (1963) on Hyptis suavesolens present study on P. bicalyculata and A. vasica confirm this. It was also observed that photo induction of 18 hours showed promotion in germination percentage in P. bicalyculata where as in 30 hours showed the promotion the rate of germination. Red light promotes the percentage germination of both the plants.Blue light is reported to have effect on seed germination (Wareing 1969) Dubey (1987) on Hypoxes aurea. But in case of P. bicalyculata and A. vasica it was found to have inhibitory effect.

Ultra violate and infrared radiation inhibit the germination of both plant confirm the work of Saxena (1963) Chatterji (1975) Dubey (1987) Sharma (1990) Effect of X-rays treatment on seed germination has been studies by various authores Benedict and Kersten (1934) Kempton and Maxivell (1948) Baghel observed no effect on germination of seeds of lpomea whereas the promotive effect in case of Melionia ,Sharma (1990) observed the promotive effect on Cucurtita and in present study X-ray treatment 6 second has promotive effect on germination of soaked seeds of P. bicalyculata and inhibitory effect on A. vasica. Fraser and Pidgeon (1916 & 1933) showed that electric shock influence the germination of some seeds in the present study in case of P. bicalyculata .Study confirm the earlier work whereas electric shock has inhibitory effect on A. vasica. after slight increase in the beginning.

REFERENCE:

1. Amen, R.D. 1963. The concept of seed dormancy Amer. Sol. 57:408-424.
2. Amen, R.D. 1964. The concept of seed dormancy Wallenstein Lab Commun 27:7-19.
3. Amen, R.D. 1968. A model of seed dormancy Bot. Rev. 34:1-31
4. Bharadwaj. N. 1990 seed coat regulated germination in Tephrosia hamiltoni and its significance inter. Symp. Of invir. Influ. Of seed & Germ. Mech. Recent. Adv. In Rec & Tec. Ab paper-39.
5. Bhat,J. L. 1968 seed coat dormancy in Indigofera glandulosa, willd. Trop. Ecol. 9:42-15.
6. Bishnoi, S. & D.D. Gautam 1990 some aspect on seed germination of Calligonum P.G. Dep. Of Bot. Dunger College Bikaner. Into symp. Inf. On seed Germ. Mech. Rec. & Tec. Abs. 40 (57).

7. Chatterji. D. 1975 studies on physiology and aut ecology of certain plants. Ph.D Thesis A.P.S. University Rewa (M.P.).
8. Chaudhary S.K. 1990 Dormancy and Qualification of germination in Partulaca quadrifida Recent Adv. In Rec.&Tec.Abs paper-41
9. Dhoran, V.S. & S.P. Grdadhe(2012)- Effect of plant growth regulator on seed germination and seeding vgour in Asparagus sprengeri international Research Journal of Biological Science. 1 (7) 6-10.
10. Dubey, S. 1987 Ecophysiological studies on Hypoxis aurea Lour. Ph.D Thesis A.P.S. University Rewa (M.P.).
11. Frankland, B.& P.F. Wareing 1960 effect of gibberilic acid on hypocotyle growth of Lettuce seedling Nature 185-225.
12. Fraseh & Pidgeon, 1916-1933 electrolysis of seed of cereals Sc. Agric. 14.141-148.
13. Khan, T. 1 & N. Bharadwaj- 1990 Temperature regulated mechanism seed and Germ. Mech. Rec. Ad in Rec & Tec. Abs 45 (66).
14. Kollar, O. 1962 Pre conditioning of germination in lettuce at the time of fruit 49. 841-844.
15. Pandeya, S.C. 1968 adaptive significance of seed dormancy in Anagallis arvensis. Trop E.coli 9: 171-193.
16. Pandeya, S.C. 1969 photo control of seed germinatiojn in Anagallis arvensis Lin. Trop. Ecology 10. 96-138.
17. Rajamanickam C. S. Anbu & Balakrishan, 2002 effect of seed germination in aohla (Emblica afficinales) south Indian hort 50 (1/3) 24-214.
18. Ratan P.B & Y.N. Reddy 2004 influence of gibberelic acid on Annona squanosa seed germination. Rec aNGRAU 32 (2) 93-95.
19. Saxena M.C. 1962 Germination studies in Hyptis suavesolens point part 2nd porce of Indian Science Congress.
20. Salgane, S.R. & Theresa 1990 role of persisting Dalapon soil on seed germination Abstract of Papers symposium on seed germination Jodhpur P- 34-36.
21. Sharma, KD. 1990 studies on seed dormancy in Peganum harmola Bot. Dept. S.G.N. Khalasa P.G. College Sriganganagar int. symp Env. Inf. On seed & Germ. Mech. Rec. Ad. In Res. & Tec. Abs 59 (81).P
22. Shukla A.P. 1977 studies in the autecology and physiology of Paspalum scarbicaletam Ph.D Thesis A.P.S. University Rewa (M.P.).
23. Singhal, B.K. 1990 A report on seed germination in some Jodhpur int. semp inf. On seed & germi. Mech. Rec. Ad. In Rec. & Tec. Abs 62 (84).
24. Vagis A. 1964 Dormancy in higher plant Ann. Rev. Pi. Physiology 15:185-224.
25. Vagis A 1965 climate control germination bud break and dormancy PP. 265-287 in environmental control of plant growth ed. L.T. evan Academic prers Newyork.
26. Vyas, L.N. 1981 The influence of temperature and light on the germination of Verbena bipinnatifolia Autta, seeds comparative physiology and ecology An international Journal of Biological studies Vol no. 4 pp: 221-224.
27. Wareing P.F. 1965 dormancy of plant Sc. Proc. 3: 529-537.
28. Wareing P.F. 1969 Germination and dormancy an the physiology of plant growth and development H.b. wilkins Megraw Hill Book Co. Newyork.