

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

185,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Study on Pollen Germination and Pollen Tube Growth of Five Iranian Apricot Cultivars on in Vitro Condition

Reza Kamrani

Islamic Azad University, Bam Branch, Iran

Abstract

This research was conducted as factorial experiment based on CRD in three replication with two factors including: cultivars in 5 levels and counting time after culture in three levels (10, 24 and 48 hours). The aims was evaluation of pollen germination and pollen tube growth. Therefore, pollen grain was collected from unopened flowers of Iran apricot cultivars including : jahangiri, azghandi, royal, shahrood 49, shahrood 18. Pollens was stored in desiccators and cultured in a medium including %15 sucrose, 100 ppm boric acid and %0.5 agar. The result was showed wide range of percentage of germination and pollen tube growth between cultivars. highest and least pollen tube length were observed in shahrood 49 (1287 μ m) and royal (812 μ m). there was not any significant relationship between germination percentage and pollen tube growth. The range of germination was % 20-54. and 24 hours was enough for obtain maximum germination.

Keywords: apricot, iran cultivars, pollen germination, pollen tube growth, in vitro

1. Introduction

Apricot is one of important fruit at world. and is very important in Iran too. and this tree are capable for irregular yielding and is limit for ecological adaptation and can use for researchers. Irregular yielding has some reasons and can omit proper varieties. Self incompatibility is an important factor And reduce yielding which proceed from lack of compatible pollen. (11, 24). Incompatibility report at apricot different varieties at all world (1,4,11,19). It is one of important big difficults. limiting at adaptation is other difficult at Apricot produce. every cultivar need to special condition (2, 9, 24). Apricot need to cold winter and warm summer (2, 15) ovule longevity, anther Reception, pollen tube growth in pistil, and temperature are important at apricot produce (3, 5, 8). pollen tube growth and germination speed is very important. at low speed, yielding reduce (8). Health in pollen is important too (13). For successful Zygotis, 20- 30 pollen is necessary (10). in vitro condition is best ways for this studies. for this experiment, pollen collection from flower anther Flower must be at the balloon stage. in turkey cultivars, sucrose reports: 10-15 % (18). At Euguslavia varieties reports :agar 1%, sucrose 15%, germination rate 14.9-88.7%. (6). and in armenia varieties report 54.9 – 72.65 % (11). At some Iranian varieties germination percentage reported 33.2 – 51.42 % (12). At different varieties need to different temperature (17, 23). low and high temperature is Harmful for germination (8). proper temperature for pollen germination in apricot Suggest 10 – 20 (8, 20). Hajilo suggested temperature 15 -20 for pollen Germination in

apricot (12). Negation suggested sucrose 15 % agar 0.6 %and boric Acid 100 ppm (21). In other experiment use agar 1 – 6 %. Sucrose 10 – 20 %, Boric acid 0.1 % and temperature 15 – 20 %centigrade degree was considered. After (10 -24 and 48)hours measure germination percent and measure pollen tube Length after 48 hour. (8, 22, 25).

2. Material and methods

This research was done at seed and plant improvement research institute of karaj in iran. All of cultivars are Iran native. Trees were six years old. The Root stocks of this trees are wild apricot. Temperature average in this city is 13.8 Centigrade degree. The Maximum of annual temperature is 26 centigrade degree on july and the minimum of annual temperature is -12 centigrade degree on anuary. The highest Temperature was 42 centigrade degree from thirty years old and The lowest temperature was -12 centigrade degree from thirty years old. Annual rain average is 260 illimeters. The lowest annual rain is 100 millimeters On april. This research was conducted as factorial experiment based on CRD in three replication with two factors including : cultivars in 5 levels including : jahangiri, azghandi, royal, shahrood 49, shahrood 18. and counting time after culture in three levels (10, 24 and 48 hours). Data analysis with “mstatc”. For this research in 5 Iran cultivars, collect pollen from flower anther and Put at Desicator and protect in refrigerator at 3-5 centigrade degree. For Pollen culture use Sterile Petridishes. Medium was included sucrose 15 %. agar 0.5 % acid boric 100 pm. and then pollens scatter on cultivation field And put in incubator at 20 centigrade degree and normal light. for estimation of pollen germination percentage at three time (10, 24, and 48) hours counted. Then get out petridishes from incubator and add some drops chloroform that Determined germination (8). at end by a microscope that connect to computer Take 15 photo from different view. and save in computer. at any view counted Total pollens and total germinated pollens that pollen tube length was equation or longer of pollen thickness. (21, 16). 45 counting use for estimate germination speed and percentage. pollens distributed low numbers in the same ways. High amount of pollen causes germination (14) and petridishes with pollen above 50 discount.

3. Summary and conclusion

Table of data analysis shows difference between apricot varieties. Germination percentage average at 5 apricot Varieties was 20 – 54 %. Pollen tube growth is different with each other.

S.V	DF	MS
variety	49.583	
Counting time	2	1.823
Time*variety	8	0.388
error	30	0.411
total	44	

Table 1.

S.V	DF	MS
Variety	4	59583.43
Error	8	11911.081
Total	14	

Table 2.

According to table :shortest pollen tube length belong to “royal” And longest pollen tube length belong to “shahrood 49” and at this experiment Pollen tube length was 812 – 1287 micro milimeter(18). Iran apricots are different with each other and can use at plant breeding and have incompatibility. yielding at incompatibility varieties need to pollination by a proper variety (21). suggestion this experiment carry out by other varieties such as turkey cultivars and other place. that’s on aportunity to thanks dr. bouzary and dr. abdolbaghi and mr. tavoosi that they were my permanent guide in doing this reaserch.

4. References

[1] Anonymous. fao state database results.available on the www. fao. org. 2001

[2] Bahly. G. H. and L. F. Hough. apricots.i n:j.janic and j.n.moore.advencesin fruit breeding. purdue university press.west lefa yet Uindiana. V.S.A. 1979

[3] Burgos. L. and J. Egea. apricot embryo-sac development in relation to fruit set. J.Hort.sci. 1993

[4] Burgos. L. T. Berenguer and j.Egea.self and cross compatibility among apricot cultivars. hortscience. 1993

[5] Burgos. L. T. Berenguer and j.Egea.embryo sac development in pollination and non pollination flowers of two apricot cultivars. J. Hortscience. 1995

[6] Duric, B.pollen germination in some apricot varieties in vojvodina.CAB abstract 1991

[7] Egea, j. andL.Burgos.apricot breeding for quality and self compatibility. acta.hort.. 1999

[8] Egea,J.,burgos,L.Zoroa,N.andEgea,L..influences of temperature on the invitro germination of pollen of apricot. horticultural science. 1992

[9] Faust,M.physiology of temperate zon fruit trees.john wiley and sons,new York.USA. 1989

[10] Gerriero, R and Bartolini,s.flower biology in apricot :main aspects and problems. 1993

[11] Guleryuz,M.and I.Bolat.investigation on characteristics of apricot cultivars in Erzincan urkey. acta horticulture.1999

[12] Hajillo, j. and gerigourian.the effect of different temperature on apricot pollen germination. Iranian scientistics and technology journal. (2000)

[13] Javadi, t and arzani, k,the effect of protection duration on iranian olive pollen in vitro germination. seed and seedling journal. (1999)

- [14] Kwack,b.h..the effect of calcium on pollen germination. Proceeding of the American society of horticulture science. 1965
- [15] Layne, R.E.G.c.H.Bailey and L.F.Hough..apricots.in :janick and j.n. Moore.fruit breeding. New York. 1996
- [16] Loupassaki, M.Vasilakakis,M.and Androulakis, I. effect of pre-incubation humidity and temperature treatment on the on the in vitro germination of ovacado pollen grains.euphytica. 1997
- [17] Luza, J. G.polito, V.S..staminate bloome date and temperature responses of pollen germination and tube growth in two walnut. American journal of botany. 1989
- [18] Mahanoglu,G.Eti,s.Kaska,N.Gulcan, R. and Aksoy, U.correlations between pollen quality, pollen production and pollen tube growth of some early ripening apricot cultivars. acta horticulture. 1995
- [19] McLaren,G. F, j.A. fraser and J.E.Grant.. pollination of apricots. Orchardist of new Zealand. 1992
- [20] Mellenthin,W.M.Wang, c.y. and wang S.Y.influence of temperature on pollen tube growth and initial fruit development in pear. hortscience.. 1992
- [21] Nejatian, m. and ebadi, a. the studi of germination and apricot pollen tube growth in vitro. agriculture scientist journal.
- [22] Obonovea, J. evaluation of physiological and morphological properties of pollen from selected apricot cultivars. CAB abstracts 1996.
- [23] Polito, V. weinbaum, S.A. and Muraoka, T.T. Adaptive responses of walnut pollen germination to temperature during pollen development. journal of american society for horticulture science. 1991.
- [24] Rodrigo, j. and M. herrero. evaluation of pollination as the cause of erractic fruit set in apricot. Hort science. 1996
- [25] Suzuki, n.Wang, x. kataoka, I. and Inoue, H.. effect of temperature on flowering and pollen germination in Japanese apricot cv. nanko. journal japans society for horticultural science. 1993