

Short term pollen storage in almond

Martínez-Gómez P., Dicenta F., Ortega E.

in

Ak B.E. (ed.).
XI GREMPA Seminar on Pistachios and Almonds

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 56

2001
pages 361-363

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=1600205>

To cite this article / Pour citer cet article

Martínez-Gómez P., Dicenta F., Ortega E. **Short term pollen storage in almond**. In : Ak B.E. (ed.). *XI GREMPA Seminar on Pistachios and Almonds*. Zaragoza : CIHEAM, 2001. p. 361-363 (Cahiers Options Méditerranéennes; n. 56)



<http://www.ciheam.org/>
<http://om.ciheam.org/>

Short term pollen storage in almond

P. Martínez-Gómez, F. Dicenta and E. Ortega

Departamento de Mejora y Patología Vegetal, CEBAS-CSIC, P.O. Box 4195, E-30080 Murcia, Spain

SUMMARY – In almond breeding programmes, circumstances usually make it necessary to keep the pollen of the male parent for later pollination of the female parent. In this work we have studied the *in vitro* germination of pollen of two almond cultivars (Ramillete and Desmayo Langueta) during 8 weeks. Three storage conditions simulating three real situations were analysed: storage of pollen at 4°C (e.g. pollination of a late flowering cultivar with an early flowering one), storage of pollen at 4°C with short periods at 22°C (e.g. pollination of several cultivars of different flowering times, with an earlier cultivar) and storage at 22°C (e.g. mailing the pollen samples abroad at room temperature). The results obtained show that pollen kept its germination potential well for two weeks in all the treatments. After this time the pollen kept at 22 °C decreased its germinability quickly.

Key words: Almond, *Prunus dulcis* Miller, pollen storage.

RESUME – “Stockage à court terme du pollen de l'amandier”. Pour les programmes d'amélioration de l'amandier, les circonstances font qu'il soit généralement nécessaire de garder le pollen du parent mâle pour une pollinisation ultérieure du parent femelle. Dans ce travail nous avons étudié la germination *in vitro* du pollen de deux cultivars d'amandier (Ramillete et Desmayo Langueta) pendant 8 semaines. Trois conditions de stockage simulant trois situations réelles ont été analysées : stockage du pollen à 4°C (par exemple pollinisation d'un cultivar à floraison tardive par un cultivar à floraison précoce), stockage du pollen à 4°C avec de courtes périodes à 22°C (par exemple pollinisation de plusieurs cultivars ayant différentes périodes de floraison par un cultivar plus précoce) et stockage à 22°C (par exemple expédition des échantillons de pollen à l'étranger à température ambiante). Les résultats obtenus montrent que le pollen a bien retenu son potentiel de germination pendant deux semaines dans tous les traitements. Passé ce temps, le pollen gardé à 22°C a rapidement vu diminuer sa germinabilité.

Most-clés : Amandier, *Prunus dulcis* Miller, stockage du pollen.

Introduction

Usually, in an almond breeding program, the pollen, which acts as vector of genetic information, is collected, dried and stored before being used to pollinate the female parents. The different flowering times of cultivars sometimes means that it is necessary to store pollen. Adequate dehydration and low temperatures seem to be of prime importance in pollen storage (Visser, 1955).

The objective of this work was to determine the germination capacity *in vitro* of the pollen of two almond cultivars stored in three different conditions, simulating three real situations in almond breeding programmes.

Material and methods

Almond cultivars: the pollen of two Spanish almond cultivars, Ramillete and Desmayo Langueta was used in the experiment.

Storage conditions: the pollen was collected, dehydrated and kept in conditions intended to simulate those which may arise in cross breeding programmes:

(i) Storage at 4°C. For example, when a late-flowering cultivar is crossed with an early-flowering cultivar.

(ii) Storage at 4°C with short periods of time (six hours) at 22°C. This represents the case of a male parent being combined with various females of different flowering times.

(iii) Storage at room temperature (22°C). This represents the case of the pollen sent through the post to other researchers at room temperature.

In vitro germination of pollen: The pollen was lightly deposited on Petri dishes containing 25 ml of culture medium (15% de saccharose and 1.2% agar) (Remy, 1953; García and Egea, 1979; Klunness *et al.*, 1983). An optical microscope (50x) was used to ascertain the number of germinated and non-germinated pollen grains. Pollen germination was considered to have taken place when the length of a pollen tube exceeded the diameter of the pollen grain (Ducon, 1968).

Results and discussion

The pollen of both cultivars showed a similar behaviour with the three treatments (Figs 1 and 2). No difference was observed between the treatments during the first two weeks of the experiment, with the germination capacity gradually falling to 77%, 75% and 70% in the case of Ramillete, and 72%, 68% and 62% in the case of Desmayo Largueta, in treatments 1 (4°C), 2 (4/22°C) and 3 (22°C) respectively.

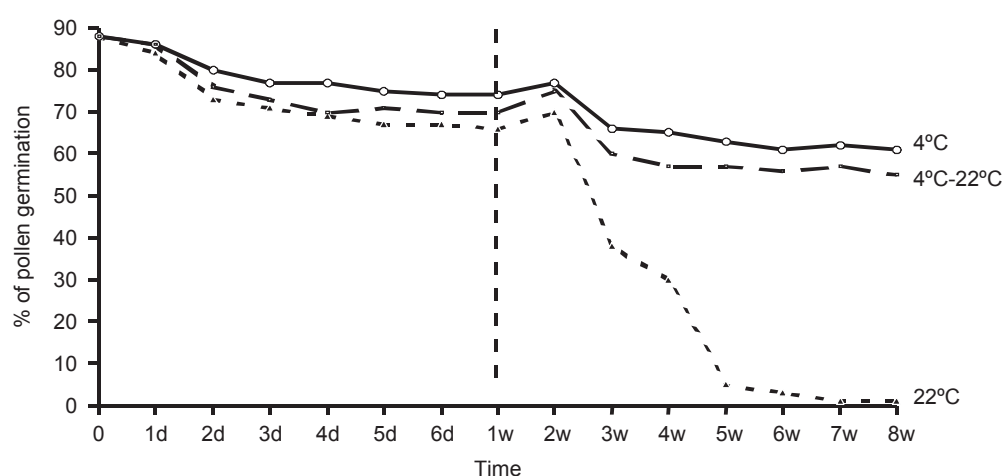


Fig. 1. Time course of *in vitro* germination capacity of pollen of cultivar Ramillete kept for eight weeks in three different storage conditions.

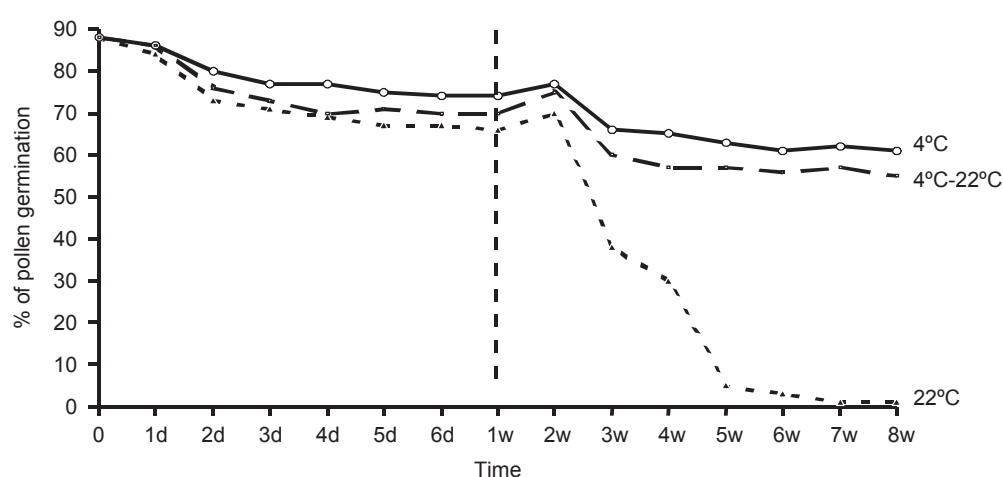


Fig. 2. Time course of *in vitro* germination capacity of pollen of cultivar Desmayo Largueta kept for eight weeks in three different storage conditions.

From this time onwards, the germination capacity of the pollens stored at 4°C and 4/22°C decreased gradually until week 8. The same parameter in the pollens stored at room temperature (22°C) fell sharply

to be almost null at week 5, when Ramillete pollen at 4°C and 4/22°C was still providing 63% and 57% germination and Desmayo Largueta 57% and 47%, respectively. Although there was no serious effect of occasional exposure to 22°C, it is clear that such continue exposure had some negative effect on the germination capacity of almond pollen.

From a practical point of view, the results show the high durability of almond pollen in the three storage conditions assayed, with excellent results for crossing purposes being possible during the two first weeks. The pollen stored at 4°C can be used for up to eight weeks (possibly longer) to efficiently pollinate late-flowering cultivars. Occasional exposure to 22°C did not substantially affect the germination potential of the pollen and this, too, can safely be used up to 8 weeks. Finally, it is clear that pollen can be sent to other research Centres at room temperature, as long as the service does not take longer than 2 weeks.

Acknowledgements

The work has been financed with the project "*Mejora Genética del Almendro*" (AGF98-0211-C03-02) from the "Plan Nacional de I+D" of Spanish Ministry of Education and Culture.

References

- Ducon, P. (1968). La fructification des arbres fruitiers. Etude de quelques caractères du pollen et de la biologie florale de l'Amandier et du Pommier. *Pomologie Française*, 5.
- García, J.E. and Egea, L. (1979). Influencia de la temperatura en la germinación del polen de variedades de almendro. *Anales de Edafología y Agrobiología*, 38: 2181-2193.
- Klungness, R., Thorp, R. and Briggs, D. (1983). Field testing the germination of almond pollen (*Prunus dulcis*). *Journal of Horticultural Science*, 58: 229-235.
- Remy, P. (1953). Contribution a l'étude du pollen des arbres fruitiers a noyau, genre *Prunus*. *Annales de Amélioration des Plantes*, 3: 351-388.
- Visser, T. (1955). Germination and storage of pollen. *Landbouwhoogeschool-Wageningen*, 55: 5-68.

