January 30, 1987

MEMORANDUM

TO: Pistachio Farm Advisors

FROM: Louise Ferguson

SUBJECT: Pistachio Pollen Storage and Collection

Here are some guidelines for pistachio pollen storage and viability testing. I still get calls about the efficacy of doing it; I have seen no solid evidence that it results in greater yield.

LF/dcm

Attachment

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Pistachio Pollen Viability Testing and Storage

The following is based on results of experiments conducted during 1986 involving pollen of four male pistachio clones: 'Peters', 'Elk Grove', 02-16 and 02-18.

Testing viability using in vitro germination:

Pollen viability can be assessed by monitoring germination on agar-solidified medium. Positive results definitely indicate that the pollen is viable. Negative results, however, must be interpreted cautiously: pollen may be inviable or, the medium may be unsuitable. This is particularly true of pollen stressed by storage where false negative results may be common. Freshly collected pollen responded well to a wide range of media components. Week-old pollen and stored pollen had more exacting requirements.

We obtained best results using a medium containing 20% sucrose and solidified with 1% Difco Bacto Agar. The addition of calcium or boron, required for germination of some species, did not affect results. Controlling the hydration rate of the pollen was more important. Rather than sowing the pollen directly on the surface of the agar medium, it was held in a moist chamber for 3 to 6 hours prior to being placed on the medium. This treatment gave considerably higher germination percentages. Week-old pollen had germination percentages from 0 to 5.5% when placed directly on agar. These results are consistent with those of previous workers who had concluded that the period of pistachio pollen viability at ambient conditions was relatively short. However, germination of this same pollen increased to over 80% for 'Peters' pollen hydrated for 3.5 hr in a saturated atmosphere. Similar results were found for stored pollen.

Pollen storage:

Three methods of storage were investigated: freezer storage (approximately -20°C), freezer storage with controlled relative humidity, and liquid nitrogen storage. These experiments are still in progress but results after 8 months indicate that freezer storage at 33% RH is favorable for retention of pollen viability. Pollen stored in sealed vials in the freezer without controlling RH had lower germination percentages. However, when germination was tested after a controlled hydration period, it did better than previous investigations would have indicated.

Relative humidity at freezer temperatures can be regulated to approximately 33% by storing the pollen over a saturated solution of MgCl₂. For our experiments, pollen was placed in a cotton-stoppered vial and the vial was put in a larger, tightly sealed vessel containing the saturated MgCl₂ solution. This procedure can be adapted for larger quantities of pollen as required.