

The effect of dormant pruning on shell dehiscence of the endocarp in pistachio fruits.

C.A. PONTIKIS*

L'EFFET D'ELAGAGE HIVERNAL SUR LA DEHISCENCE DE LA COUILLE DE L'ENDOCARPE DES FRUITS DU PISTACHIER.
C.A. PONTIKIS.

Fruits, Jan. 1986, vol. 41, n° 1, p. 55-56.

RESUME - Un élagage assez sévère qui supprime plus de 30 p. 100 du feuillage réduit de 10 à 20 p. 100 la déchirure des pistaches. Le poids de la noix n'est pas affecté. L'allongement du rameau est plus important, mais les différences ne sont pas significatives. Le niveau de l'azote est significativement plus élevé que chez le témoin et il semble qu'il affecte la déhiscence des pistaches.

INTRODUCTION

Pistachio fruits are mainly marketed in-shell, and endocarp dehiscence (shell splitting) is a desirable trait, as it facilitates shell removal by the consumer. Dehiscence is affected by several factors, as pollen source (3, 4, 5), lack of chilling to break the rest period of buds (1), cultivar (4, 5), age of tree (2) and summer temperatures (unpublished data). In the work reported here we examined the effect of dormant pruning on shell dehiscence of Pistachio nuts in order to improve fruit quality.

MATERIALS AND METHODS.

Pistachio trees of the cultivar «Aegenes» 40 years old on *P. terebinthus* cv. Tsikoudia seedling rootstock, spaces 6 x 6 were selected in the pistachio orchard of the Agricultural College of Athens. The trees had moderate vigor. Prior to the initiations of treatments in 1983, the trees had been lightly dormant-pruned. Two treatments were applied in two separate experiments each of the year 1983, 1984 and 1985. Each treatment was replicated 6 times, in a single-tree. Halves of trees were pruned because of the variation

* - Department of Pomology, Agricultural College of Athens, Botanikos, Athens, Greece.

from tree to tree in percentage of dehisced nuts produced. This made it possible to compare nuts from the same tree. In the experiment I treatments were : 1) Control-no dormant pruning and 2) light dormant pruning (removed 10-15 % of the canopy growth), while in experiment II were : 1) Control-no dormant pruning, 2) lightly severe dormant pruning (removed 30-40 % of the canopy growth). Pruning was similar for all trees in each experiment and consisted of thinning cuts to allow better light penetration.

Nuts from the pruned and unpruned portions of the trees, when harvested, were kept separately, hulled by hand, and dehydrated. Percentages of dehisced and undehisced nuts, as well as their weights were determined on the whole nuts from each of the pruned and unpruned halves of each tree.

RESULTS AND DISCUSSION

Maturity of nuts, as judged by appearance and time of hull separation from the shell, was affected by lightly severe pruning and accelerated maturity by one week. Kernel weight was unaffected by any pruning treatment. The percentages of split nuts in the control treatments were significantly higher than in the lightly severe pruning treatments in all experiments (Table 1). Current season's shoots were measured at the end of July. Although both

TABLE 1 - Effect of pruning on percentage of split pistachio nuts (*).

Treatments	Split nuts (%)		
	1983	1984	1985
control	72.7	54.8	75
lightly severe pruning	53.1	38.4	64.6
	p = 0.01	p = 0.01	p = 0.05

* - Average of 6 replications.

TABLE 2 - Effect of pruning on percentage of nitrogen in leaves from bearing shoots of pistachio (*).

Treatments	Nitrogen (%) (dry matter)		
	1983	1984	1985
control	2.12	2.15	2.11
lightly severe pruning	2.28	2.30	2.25
	p = 0.01	p = 0.01	p = 0.01

* - Average of 6 replications

pruning treatments promoted shoot elongation more than the control, their differences were not significant. Samples of leaves from bearing shoots of the treatments, collected at the end of July, were clipped, dried to constant weight and analyzed for nitrogen by the microkjedahl method. Nitrogen level was significantly higher than in the control only in the lightly severe pruning treatment (Table 2).

It seems that shell dehiscence is associated with the nitrogen level. The data indicate that nitrogen excess

favors the shoot growth, retards the rate of seed growth and development and delays fruit maturity. Thus ultimate kernel's size is attained when the ventral and dorsal sutures of the endocarp has been lignified completely and does not dehisce easily (4).

In conclusion, pruning which removes more than 30 % of the canopy growth can increase the percentage of unsplit nuts and such attempts should be avoided.

REFERENCES

1. CRANE (J.C.) and TAKEDA (F.). 1979.
The unique response of the pistachio tree to inadequate winter chilling.
HortScience, 14 (2), 135-137.
2. CRANE (J.C.), IWAKIRI (B.T.) and LIN (T.S.). 1982.
Effects of Ethephon on Shell Dehiscence and flower Bud Abscission in Pistachio.
HortScience, 17 (3), 383-384.
3. PEEBLES (R.H.) and HOPE (C.). 1937.
The influence of different pollens on the development of the Pistachio nut.
Proc. Amer. Soc. Hort. Sci., 34, 29-32.
4. PONTIKIS (C.A.). 1975.
Contribution to studies on the effect of pollen of different species and cultivars of the genus *Pistacia* on nut development and quality.
Anotate Geoponike Shole Athenon (Greek).
(*Horticultural Abstracts*, 47, Abstr. 10270).
5. WHITEHOUSE (W.E.), KOCH (E.J.), JONES (L.E.), LONG (J.C.) and STONE (G.L.). 1964.
Influence of pollens from diverse *Pistacia* species on development of Pistachio nuts.
Proc. Amer. Soc. Hort. Sci., 84, 224-229.

