

# Chilling Requirements of Three Pecan Cultivars<sup>1</sup>

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**Abstract.** Chilling requirements for 3 pecan cultivars are reported for the first time. Stem cuttings with 4 buds of 'Desirable', 'Mahan', and 'Stuart' pecan (*Carya illinoensis* (Wang.) K. Koch) were forced in a greenhouse after each 100 hours of field chilling below 7.2°C during the 1969-70, 1970-71 and 1971-72 dormant seasons and bud break measured 21 days later. A chilling requirement of 500 hours was determined for 'Desirable' and 'Mahan', and 600 hours for Stuart.

Considerable variability exists on the characteristics of the rest phenomenon in pecans (1,2,3). Dormant pecan stem-cutting propagation necessitates collecting cuttings after leaf drop and before the chilling requirement is satisfied (4). An experiment was conducted at College Station, Texas, during 3 dormant seasons to determine the response of 'Desirable', 'Mahan' and 'Stuart' to various lengths of chilling under existing winter temperatures and daylengths.

Non-terminal stem cuttings, 15 cm long, from 'Mahan', 'Desirable' and 'Stuart' pecan trees grown in the Adriance Research Orchard in Burleson County, Texas were collected at 100 hr intervals up to 800 hr of field chilling below 7.2°C throughout the 1969-70 (3 cuttings per cultivar) 1970-71 (10 cuttings per cultivar) and 1971-72 (10 cuttings per cultivar) dormant seasons. The cuttings were placed in a sand: peat mix under intermittent mist in a greenhouse at normal winter daylengths and approximately 21° to force the buds. Bud break was rated at four nodes on each cutting 21 days after placement in the greenhouse. Buds which had expanded until the outer bud scale was shed and the inner bud scale had split were considered forced and no longer dormant. Once bud break began on a cutting the

buds continued to expand with time; however, an increasing percentage of the buds forced in 21 days with additional chilling.

The 800 hr of chilling was relatively uniformly distributed over the 3 winter periods. 'Desirable' and 'Mahan' required approximately 500 hr of chilling while 'Stuart' required about 600 hr of chilling below 7.2°C to have a statistically significant increase in bud break (Table 1). There was no statistically significant increase in bud break for 'Stuart' until 600 hr of chilling was received. Consequently, 'Stuart' is considered to have a higher chilling requirement than 'Mahan' or 'Desirable'. Data presented

Table 1. Average bud break for 3 pecan cultivars forced in a greenhouse following 8 periods of field chilling below 7.2°C at College Station, Texas during the 1969-70, 1970-71 and 1971-72 dormant seasons.

Hours of Chilling	Bud break (%)		
	Desirable	Mahan	Stuart
100	04 a <sup>z</sup>	01 a	01 a
200	08 a	02 a	00 a
300	03 a	03 a	00 a
400	02 a	02 a	00 a
500	25 b	35 b	13 a
600	60 c	59 c	41 b
700	71 c	77 c	52 b
800	95 d	94 d	93 c

<sup>z</sup>Mean separation by Duncan's multiple range test, 5% level.

here are insufficient to determine if the pecan rest period is obligatory.

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HortScience 13(6):694-696. 1978.

# Relationship of Endogenous Flower Bud Abscisic Acid to Peach Chilling Requirements, Bloom Dates, and Applied Gibberellic Acid<sup>1</sup>

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**Abstract.** Concentrations of total abscisic acid (ABA) in flower buds from 7 clones of peach (*Prunus persica* (L.) Batsch) were measured on 4 sampling dates and compared with chilling requirements (CR) of these clones. In December the correlation coefficient between ABA content and CR was  $r = 0.89$ . ABA concentration increased with tree vigor. Fall-applied gibberellic acid (GA<sub>3</sub>) decreased ABA concentration in flower buds in December and delayed bloom the following spring.

ABA is presumed to be a major factor in controlling winter rest (10,16). In peach flower buds an ABA-like inhibitor increased during autumn until leaf fall, and then decreased throughout the winter until termination of rest

(3). In 3 peach cultivars, ABA concentration was positively correlated with CR of the flower buds (5). Also, seed of a high chilling peach cultivar contained more ABA-like inhibitor than did those of a low chilling cultivar (7). Activity decreased with stratification of seeds of both peach (7) and plum (11). However, ABA concentration in apple seed did not parallel germination potential (1).

GA application partially or completely terminates rest in some plants

<sup>1</sup>Received for publication March 23, 1978. Approved for publication as Technical Article No. TA 1411 of the Texas Agricultural Experiment Station, College Station. Research supported by U.S. Department of Agriculture Cooperative Agreement No. 12-14-100-10, 44 (34).

The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper must therefore be hereby marked *advertisement* solely to indicate this fact.

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<sup>4</sup>Authors express appreciation to Dr. Page W. Morgan for advice and criticism throughout the study.

<sup>1</sup>Received for publication April 10, 1978.

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