

Performance of Mature Pecan Varieties in the Low Desert of Pinal County 1997-1999

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Abstract

Twelve varieties of pecans were evaluated for yield, viviparity, and nut quality. The commercially recommended varieties 'Western Schley' and 'Wichita' produced the greatest yields but also had the highest percentage of pregermination. The varieties 'Cheyenne' and 'Sioux' exhibit great potential for commercial production in the low desert of Arizona.

INTRODUCTION

In the past the primary pecan varieties recommended for planting in Arizona were 'Western Schley' and 'Wichita'. The 'Bradley' is sometimes planted for pollination purposes opposite the 'Western Schley' in some situations but because of low production is not acceptable as a main variety. The main varieties are fairly well adapted to the low desert but in some years viviparity is devastating. Often, there is a low to no profit to the grower. The pecan tree grows well but production is rather low (1500 lbs/acre) compared to trees grown in the mid to high elevations (2000 lbs/acre). High night time temperatures, common in the low desert, are the probable cause for the yield difference. In addition, the high daytime temperature occurring during nut maturity results in pregermination of nuts on the tree aka viviparity. It appears the 'Western Schley' and 'Wichita' are not genetically conducive for good consistent production without a high incidence of viviparity in the lower elevation ranges of the desert in AZ. In this regard, we began to evaluate an array of pecan varieties for production and percentage of viviparity for adaptation to these harsh environmental conditions.

PROCEDURES

During the 1997 growing season we selected five trees from each variety in a commercial pecan orchard which had been planted to an array of pecan varieties in the mid 1970's. Each tree was marked so that we could return and evaluate the same trees from year to year. At harvest yields were estimated by harvesting 1/25th of the area beneath each tree using a set of ropes to designate the harvested area. A random sample of 100 nuts from this harvested area were graded for viviparity and a random sample of ten nuts were processed for determination of percent kernel.

RESULTS AND DISCUSSION

The average per tree yield for the three years varied considerable among varieties (Table 1). The highest yielding varieties were the old standards 'Western Schley' and 'Wichita' followed by 'Tejas' and 'Sioux'. Medium yielding varieties were 'Bradley', 'Cheyenne' and 'Shoshoni'. It was interesting to note that the 'Chickasaw' and 'Shoshoni' did not yield any crop in 1997. The 'Shoshoni' did respond with a fairly decent yield in 1998, however the 'Chickasaw' did not. In 1998 the 'Choctaw', 'Cheyenne', 'Comanche', 'Mohawk', 'Sioux' and 'Tejas' did not yield many pecans. Varieties that had yields below the medium yield range are not well suited for the environmental conditions of this test. In terms of kernel percentage the 'Wichita' was the highest with 'Comanche' and 'Tejas' the lowest (Table 2). Kernel percentage is very important as price received is dependent on kernel percentage. In other words in the shelling trade buyers are buying nut meats not in shell pecans.

An important aspect in growing pecans in the low desert is the factor of viviparity. Viviparity renders a nut non salable and increases the cost to the grower who has to eliminate the damaged nut before delivery to the buyer. The incidence of viviparity was very high in 1997 with weather conditions conducive for maximum expression of the problem (Table 3). The primary commercial varieties, 'Western Schley' and 'Wichita' are very susceptible to viviparity as evidenced by a loss of crop exceeding 30-46 percent. Conversely, the 'Tejas', 'Sioux', 'Cheyenne' and

'Bradley' exhibited substantially less at 5,14,14, and 20 percent respectively. The three year average resulted in these four varieties exhibiting low viviparity rates. The Wonder Nut had a high incidence of viviparity. This variety does not show promise for commercial production at this time.

CONCLUSIONS

The primary pecan varieties 'Western' and 'Wichita' performed superior to other varieties in terms of yield but demonstrated a high incidence of viviparity. The high rate of viviparity expressed by these varieties are costly in terms of harvesting, processing, and marketing. Varieties included in this evaluation showing extreme promise for commercial planting are 'Cheyenne', 'Sioux', and 'Bradley'. The 'Tejas' yielded well and viviparity incidence was low however kernel percentage was low. The two varieties with the greatest potential are 'Cheyenne' and 'Sioux'. This experiment will be conducted one more year to fully ascertain parameters such as alternate bearing and viviparity on variety performance. New cultural techniques such as hedge pruning will have a bearing on reducing the alternate bearing habit of these varieties.

Table 1. Average per tree yield (lbs) of various pecan varieties grown at Picacho, AZ for 1997-1999.

VARIETIES	<u>Yield (lbs/tree)</u>			
	1997	1998	1999	Avg.
Bradley	34.4	61.9	54.3	50.2
Cheyenne	98.2	-----	70.3	56.2
Chickasaw	-----	9.1	84.6	31.2
Choctaw	113.6	-----	-----	37.8
Comanche	84.7	-----	-----	28.2
Mohawk	48.1	-----	49.0	32.3
Shoshoni	-----	37.7	112.8	50.2
Sioux	113.1	-----	89.0	67.3
Tejas	133.3	-----	110.0	81.1
Western Schley	83.7	158.2	53.2	98.4
Wichita	95.1	48.1	95.5	79.6
Wonder Nut	-----	-----	23.8*	-----

* First Harvest

Table 2. Average nut percent kernel for various pecan varieties grown at Picacho, AZ 1997-1999.

VARIETIES	<u>% Kernel</u>			
	1997	1998	1999	Avg.
Bradley	59	61	61	60
Cheyenne	58	-----	59	59
Chickasaw	-----	58	52	55
Choctaw	58	-----	-----	58
Comanche	49	-----	-----	49
Mohawk	57	-----	61	59
Shoshoni	-----	55	55	55
Sioux	58	-----	58	58
Tejas	51	-----	52	52
Western Schley	59	57	59	58
Wichita	58	62	61	60
Wonder Nut	-----	-----	55	55

Table 3. viviparity incidence as determined by nut splitting from various pecan varieties grown at Picacho, AZ 1997-1999.

<u>% Splits</u>				
VARIETIES	1997	1998	1999	Avg.
Bradley	20	1	5	9
Cheyenne	14	----	3	9
Chickasaw	67	0	6	37
Choctaw	----	0	----	----
Comanche	35	----	----	35
Mohawk	26	----	2	14
Shoshoni	----	8	12	10
Sioux	14	----	5	5
Tejas	5	----	7	6
Western Schley	30	6	39	25
Wichita	46	23	30	33
Wonder Nut	----	----	27	27