

2. Valencia Peanut Breeding Lines and Variety Trials

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- The gross returns for breeding lines NMX 1, NMX 2 and NMX 5 was greater than \$ 633/ac at Taylor Nunn's farm in Portales.
- Bulgarian lines S-3685 and S-3663 at South Research Facility in Clovis yielded 10% higher than the checks Valencia – A (2099 lbs/ac) and Valencia – C (2297 lbs/ac)

Objective

To develop a variety/varieties that can yield high, produce 3 or more kernels per pods, resistant to diseases, maintain red skin and taste of Valencia.

Material and Methods

Two experiments were conducted at two different locations to evaluate the performance of Valencia peanuts. The first experiment consisted of 13 lines of Valencia peanuts that were planted at South Research Facility (SRF) on June 3, 2003. The varieties consisted of two standard checks, eight lines from Bulgaria and three preliminary breeding lines. When the field was sufficiently dry, the experimental area was disked, fertilized with 290 lbs/ac of 20-21-0-15S- 0.1N and Prowl herbicide was applied at 2.5 gallons /ac and both fertilizer and herbicide were incorporated into the soil to a depth of 2 to 3 inches with a disk. The plot was leveled and beds were formed using a rolling cultivator. Plot length was 50 feet long by two 40-inch rows. Seed rate used was 80 lbs/ac; approximately 4 to 5 seeds per row foot. Insecticide Temik was drilled behind the seed at the rate of 6 lbs/ac. Plots were planted using a two row Max

Emerge cone seeder. The soil at SRF is classified as a Amarillo Clovis loamy fine sand. The plots were intercultivated three times prior to pegging to suppress the weed population. Post emergence herbicide Frontier was applied @ 25 oz/ac. The experimental design was a randomized complete block with three replications. The plots were irrigated with a sub surface drip irrigation system three times a week based on estimated daily evapotranspiration (ET) values multiplied by crop coefficient value. Two applications of fungicide Bravo @ 1.5 pt/ac mixed with Folicur @ 6oz/ac were sprayed on July 1, 2003 and July 10, 2003. All the plots were harvested on October 13, 2003.

The second experiment consisted of 22 lines of Valencia peanuts that were planted at Taylor Nunn's farm in Portales, at an elevation of 4200 feet, using their equipment and normal cultural practices. The two sites differ in elevation by about 200 feet with the South Research Farm being higher. The varieties were planted on June 9, 2003 in 2-row plots with three replications. The field was fertilized with 80 lbs/ac of nitrogen prior to planting. Seed rate used was 80 lbs/ac. A pre emergence herbicide Dual was applied at 1.5 pint /ac. Plot length was 50 feet long by two 38-inch rows. Insecticide Temik was drilled behind the seed at the rate of 6 lbs/ac. No fungicides were applied. Plots were planted with a 12 row seed drill attached with an insecticide boxes. The plots were irrigated with center pivot irrigation. All plots were dug on October 10, 2003 and harvested on October 22, 2003.

Results and Discussion

The New Mexico peanut research has embarked upon a program to improve the Valencia peanuts belonging to the subspecies *fastigiata* type. The 2003 peanut crop in New Mexico will be one of the lowest in many years. The data in Table 2 and 3 represents only one year results. The results of the breeding lines at SRF along with checks are presented in Table 2. Mean yield for the trial at SRF was only 1868 lbs/ac. This low yield of 30% below the state average at this location is due to severe pod rot disease caused by a complex of soil pathogens in combination with spray drift from herbicide Roundup from adjacent plots. There was no significant difference between the

two checks Valencia – A and Valencia – C. The Bulgaria line Sadovo 3685 resulted in higher yield, higher grade and lower discoloration resulting in higher gross return per acre. The Bulgarian lines are mainly bold seeded like the Virginias and are mostly 2 to 3 seeds per pod. They are very rarely four seeds per pod unlike the New Mexico Valencias. Among the three preliminary NMX lines tested only NMX 2 gave higher yield and gross return per acre compared to other lines tested at this location for the 2003 growing season. Multiple location trials shall be conducted next year to confirm these results.

The results of the breeding lines at Taylor Nunn's farm are presented in Table 3. Mean yield for this location was 2693 lbs/ac. Yield at this location was above average compared to other location. The breeding line NMX-1 and NMX 2 had the highest yield at this location than the standard varieties that are grown in this area. The commercial lines H&W Genetex 102 had the highest grade. The standard check Valencia – C not only had high yields but also high grade and lower discoloration resulting in higher gross return per acre. Out of the 22 lines tested at this location only four lines – Valencia C, NMX-1, NMX-2 and NMX-5 resulted in higher gross return per acre (> \$ 627). The seed yield from a single plant selection has shown that varieties Sadovo 3685 and NMX -2 produced higher seed weights compared to Valencia's – A and C (Data not shown).

Four reciprocal crosses were made using parents Valencia – A, Valencia- C, Kalina and Rossita.. Twelve crosses were made in the greenhouse at Las Cruces. Single plant selections were also made at harvest. All these materials were planted at Puerto Rico winter nursery and will be harvested in April 2004.

Table 1. Performance of peanut lines at South Research Facility, Clovis, Curry County, 2003.

Variety or Line	Yield (lbs/ac)	Grade (TSMK)	Discoloration (%)	Gross Return (\$/ac)
Valencia –A	2099 bc	57 ab	11 g	316 bcde
Valencia – C	2297 ab	58 ab	36 cde	350 ab
Sadovo - 3840	1315 e	49 c	15 fg	172 hi
Sadovo – 3685	2492 a	59 a	13 g	386 a
Sadovo – 3663	2447 ab	51 c	31 de	333 abc
Sadovo – 3190-5	1782 cd	51 c	29 e	241 fg
Sadovo – 3190-b	861 f	50 c	40 cde	114 i
Sadovo – 3211	1251 ef	50 c	54 b	167 hi
Sadovo – 3611a	1576 de	52 c	68 a	216 gh
Sadovo – 3256b	2120 abc	50 c	49 bc	281 cdef
NMX – 1	1893 cd	52 c	44 bcd	259 efg
NMX - 2	2342 ab	52 c	36 cde	323 bcd
NMX - 3	1808 cd	56 b	28 ef	268 defg
Trial Mean	1868	53	35	264
P value	< 0.0001	< 0.0001	< 0.0001	< 0.0001
CV	12.4	3.0	23.4	13.1
LSD	391.4	2.7	13.8	58.2

¹Means followed by the same letter are not significantly different by Fisher's LSD (p=0.05)

Table 2. Performance of peanut lines at Nunn's Farm, Clovis, Roosevelt County, 2003.

Variety Or Line	Yield (lbs/ac)	Grade (TSMK)	Discoloration (%)	Gross Return (\$/ac)
Valencia – C	3494 bc	69 abc	11 h	627 a
Valencia – A	2824 ef	63 efg	70 a	462 d
Sadovo – 3685	3497 bc	62 fghi	54 bc	564 b
Sadovo – 3663	2912 e	67 abcde	43 cde	503 c
Sadovo – 3240	2754 f	60 ghi	52 bcd	428 ef
Sadovo – 3256	1628 j	67 abcde	49 bcde	282 i
Sadovo – 3542	3471 c	65 def	49 bcde	584 b
Sadovo – 3256b	1660 j	66 bcdef	49 bcde	283 i
NMX – 1	3706 a	66 cdef	51 bcd	633 a
NMX - 2	3656 a	67 abcde	16 h	636 a
NMX - 3	2225 h	55 jk	38 ef	320 h
NMX - 5	3633 ab	68 abcd	40 de	637 a
NMX – 9	2235 h	54 k	60 ab	318 h
NMX – 10	2741 fg	64 def	50 bcd	459 de
NMX – 12	2201 h	59 ab	25 g	337 h
NMX – 20	2182 h	70 hij	46 cde	395 g
H&W – 101	2598 g	70 abc	22 gh	470 d
H & W – 102	2181 h	70 a	27 fg	397 fg
H & W – 136	3162 d	70 ab	25 g	573 b
Georgia – Red	1654 j	58 ijk	59 ab	251 i
McRan	2817 ef	64 def	52 bcd	471 cd
Brown – 1	2021 i	62 fgh	12 h	328 h
Mean	2693	64	41	452
P value	<0.0001	< 0.001	< 0.0001	< 0.0001
CV	3.29	3.96	17.37	4.49
LSD	145.89	4.21	11.71	33.47

¹Means followed by the same letter are not significantly different by Fisher's LSD (p=0.001)