2000-2001
Onion Variety Trials
at New Mexico State University

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CONTENTS

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During June and July, New Mexico produces more than 50 percent of the onions sold in the United States (U.S. Dept. Agric., 2000). New Mexico produces three separate onion crops that differ in their harvest times. The fall-seeded crop is planted in September and October and harvested in May and June of the following year. The transplanted crop is transplanted in February and harvested in June. The spring-planted crop is planted from January to March and harvested in July.

For each planting, separate cultivars must be used, because a single cultivar may have a harvest time of only two weeks. A continual onion harvest from late May to early August is desired. Within each planting, several different cultivars must be grown, because each crop harvest time may last four weeks.

In addition, bulbing in onions is initiated by increasing day length. Onion cultivars differ in the number of hours needed for bulb initiation. Cultivars that required 8-12 hours of day light for bulbing are considered short-day cultivars. Cultivars that require 13-14 hours are considered intermediate-day onions, while cultivars that require 15 hours or more are considered long-day onions.

Within each day-length bulbing sensitivity classification, cultivars are described based on their relative maturity when compared with each other (early, intermediate, late). For a particular bulb crop, such as the fall-seeded crop in New Mexico, cultivars may be described based on their maturity relative to the length of the crop's entire harvest period as early, intermediate or late. The chosen cultivars for a particular crop may be a mix of short-day and intermediate-day cultivars to give the grower a continual harvest.

Also, cultivars differ in their scale color, which may be white, yellow or red. Thus, numerous onion cultivars must be available and adapted to southern New Mexico growing conditions to provide continual harvest of yellow, white and red onions from May to August.

Southern New Mexico possesses a unique environment for growing onions. Temperatures are warm enough during the winter season for onions to be overwintered without substantial plant losses. Conversely, temperatures are cold enough to induce premature flowering or bolting and yield loss of fall-seeded cultivars, unless bolting resistance is present. In addition, onions are harvested during the hottest months of the year—June and July—which tends to shorten storage life. Also in July, New Mexico receives a significant amount of precipitation that can make harvesting difficult, increase disease problems and result in yield losses. For these reasons, cultivars that perform well in other growing regions do not necessarily perform well in New Mexico. The objective of this study was to evaluate cultivars and advanced breeding lines from commercial sources and NMSU's onion breeding program for their adaptability to and performance under southern New Mexico growing conditions.

MATERIALS AND METHODS

Three variety trials (fall-seeded, spring-transplanted and spring-seeded) were initiated at the Fabian Garcia Research Center in Las Cruces, N.M., for 2000-2001. Onions have been grown on the fields used for these trials annually for many years. As a result, pink root (*Phoma terrestris*) and Fusarium basal rot (FBR) (*Fusarium oxysporum* f. sp. *cepae*) incidences are higher in our fields than levels observed in growers' fields. The results obtained from these trials are specific to this location; results may differ in other locations. Also, environmental conditions and the performance of the entries tested change from year to year.

Within each trial, entries were grouped based on approximate bulb maturity (early, intermediate and late) for onions grown in southern New Mexico. Within

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each grouping, entries were arranged in a randomized complete block design with four replications per entry. Entries consisted of commercial cultivars (Cramer, 2000), NMSU cultivars, experimental commercial lines and experimental NMSU lines. For the fall-seeded trial, 11 entries were placed in the early-maturing group (table 1); six entries were placed in the intermediate-maturing group (table 3); and four entries were placed in the late-maturing group (table 5). For the spring-transplanted trial, 13 entries were placed in the main, transplant season maturity group (table 7); and four entries were placed in the late-maturing group (table 9). The main transplant season would be considered the harvest time that falls between the harvest of fall-seeded cultivars and the harvest of spring-seeded cultivars. In Las Cruces, this usually occurs between late June and early July. For the spring-seeded trial, 14 entries were placed in the early-maturing group (table 11); five entries were placed in the intermediate-maturing group (table 13); and five entries were placed in the late-maturing group (table 15).

All entries in the fall-seeded variety trial were seeded on Sept. 14, 2000, and were thinned on Oct. 27, 2000, to 4 in. (10 cm) between plants. On Oct. 10, 2000, all entries for the transplant trial were seeded in a field at the Fabian Garcia Research Center to produce transplants that were transplanted on Jan. 30, 2001. Transplants with three to four true leaves were used. For each entry, transplants of the same relative size were grouped together and placed in the same plot. Transplant size within each plot was kept as uniform as possible. Some variation in transplant size for each entry may have existed between plots in different replications. In general, the largest transplants were placed in the first replication, while the smallest transplants were placed in the fourth replication. All entries for the spring-seeded trial were seeded on Jan. 16, 2001, and thinned on Feb. 23, 2001, to 4 in. (10 cm) between plants.

For each trial, entries were seeded or transplanted into standard, vegetable beds on 40 in. centers. Plot lengths were 8 ft. The number of plants per plot for each trial ranged from 40 to 55. For most trials, differences in plant density among entries were minimal. Plant stand differences among entries were reported when they occurred. Plots with less than 10 plants were not measured and were considered missing for statistical analysis.

All fields were managed in a similar fashion using standard cultural practices for producing onions in southern New Mexico (Corgan et al., 2000). Before planting, 250 lbs of triple superphosphate (0.0N-20.1P-0.0K) per acre were applied to each field. Subsurface drip irrigation placed 4 in. (10 cm) below the surface was used with 8 in. (20 cm) between emitters. Water was applied as needed. Uran 32 (urea and ammonium nitrate) (32N-0.0P-0.0K) was applied at 20-30 (parts per million) through the drip lines for a total of 200-250 lbs of nitrogen per acre for the crop. Trials were sprayed for thrips using a synthetic pyrethrin (Karate) as needed.

Before harvest, the maturity date (80 percent of tops down) was estimated for each plot. All four replications of a particular entry were harvested when all of the plots exhibited 80 percent or more of the plants with their tops down (tables 1, 3, 5, 7, 9, 11, 13, 15). The number of plants with seedstalks was counted for entries in the fall-seeded trial. Seedstalk formation usually is not a problem for entries in the spring-transplanted and spring-seeded trials. The percentage of seedstalks, a measure of bolting, was calculated by dividing the number of plants with seedstalks by the total number of plants per plot. Once bulbs were removed from the ground, the total number of bulbs was counted.

Twenty-five randomly selected bulbs per plot were rated for pink root severity on their roots, using a subjective rating of 1 (no pink roots) to 9 (heavily infected roots). The basal plate of 25 randomly selected bulbs was cut transversely, and the FBR severity was rated using a subjective rating of 1 (no diseased tissue) to 9 (70 percent or more diseased tissue). The percentage of diseased bulbs (either pink root or FBR) was calculated using the rated bulbs. Bulbs that received a score of 9 on the FBR scale remained at the plot and were not used to calculate bulb yield per plot.

Bulb tops and roots of all plants were clipped. Bulbs were placed in burlap sacks and cured at field conditions for four days. After curing, the total bulb fresh weight was measured for each plot. Bulbs were then graded to remove culls (diseased bulbs, bulbs under 1.5 in. (3.8 cm) in diameter, split bulbs, double bulbs).

The number of culls was subtracted from the total number of bulbs to yield the number of marketable bulbs per plot. The marketable bulbs per plot were weighed to measure the marketable fresh weight per plot. The percentage of marketable yield was calculated by dividing the marketable weight per plot by the total weight per plot. The number of sacks per acre was determined using marketable bulb weight per plot with a bed width (center to center) of approximately 40 in. (1 m) and 50 lbs (22.7 kg) per sack.

The average bulb weight was calculated by dividing total marketable bulb weight by total marketable bulb number per plot. The percentage of bulbs with single growing points was determined by counting the number of bulbs with single growing points (single centers) or multiple growing points located within 0.5 in. (1.3 cm) of the center when cut transversely at the vertical center.

The means for each trait over four replications were calculated for each entry and for the sum of entries within each group using the Proc Means statement of the

SAS statistical software (SAS Institute, Cary, N.C.). Within each group, differences between entries were calculated for each trait using the Proc GLM statement of SAS. In addition, a protected Fisher's least significant difference (LSD) mean separation test was calculated at a probability level of 5 percent for each trait using SAS.

RESULTS

Fall-Seeded Trial

Early maturity. The maturity dates of entries in the early-maturing, fall-seeded trial ranged from May 11 to 29, 2001 (table 1). The maturity time was comparable to maturity dates in previous years, except for last year's trial in which all entries were early-maturing (Cramer et al., 1998; 2000; 2001). The mean percentage of seedstalks varied among entries tested. However, the percentage generally was low (3.7 percent) for all entries (table 1). Most NMSU and 'NuMex' entries except 'NuMex Sweetpak' exhibited a low percentage of seedstalks, while 'Texas Early White' had the highest bolting percentage (19.6 percent). The date chosen for the fall planting was one to three weeks earlier than the planting dates used by commercial growers in this area, so that entries could be screened for bolting resistance. The bolting percentage of 'NuMex Sweetpak' and 'Texas Early White' would be less with later planting dates. The average seedstalk percentage was lower in 2001 (3.7 percent) than in previous years [31, 15.1 and 12.0 percent in 1998, 1999, and 2000, respectively] (Cramer et al., 1998; 2000; 2001).

Pink root rating generally was low (2.6 average) for most entries. However, 'NIZ 3700' was very susceptible to pink root, showing a higher severity (5.5) than any other entry (table 1). The mean percentage of bulbs with pink root generally was high (91.5 percent) for all entries with no difference in incidence between them. The mean pink root incidence was greater in 2001 (91.5 percent) than in the previous year (53.4 percent) (Cramer et al., 2001). This increase in pink root incidence likely resulted from later-maturing entries in this year's trial as compared to the previous year's trial. The mean Fusarium basal rot (FBR) severity generally was low among all entries, while the mean FBR incidence was variable (table 1). 'NIZ 3700' had the greatest FBR severity and incidence. This incidence level would raise concerns for commercial production of this entry. The FBR severity and incidence of the entries in this year's trial were comparable to results observed last year (Cramer et al., 2001).

The percentage of marketable bulbs was variable among entries, with NMSU 00-13-1, NMSU 99-16, 'NuMex Chaco', 'NuMex Mesa', and 'NIZ 3700' possessing high percentages of marketable bulbs (table 2). In previous years, the percentage of marketable bulbs was comparable for these entries (Cramer et al., 2000; 2001). Marketable bulb yield (number of sacks per acre) varied greatly among entries. 'Daybreak', 'Ibex', NMSU 99-16, 'NuMex Chaco', and 'NuMex Mesa' produced high bulb yields, while NMSU 99-28, 'NIZ 3700', and 'Texas Early White' produced yields lower than that of a majority of the cultivars tested (table 2). The low yield of 'NIZ 3700' resulted from high pink root susceptibility and small bulb size. The average bulb yield in 2001 (1,250 sacks/acre) was greater than in 2000 (1,094 sacks/acre) and comparable to 1999 (1,232 sacks/acre) (Cramer et al., 2000; 2001). Mean bulb size generally was large (14.2 oz), with NMSU 99-28, NMSU 99-91, 'NIZ 3700' and 'Texas Early White' producing smaller bulbs (table 2). The small bulb size of NMSU 99-91 resulted from its early maturity (table 1). The average bulb size in 2001 generally was greater for all entries tested in previous years (Cramer et al., 2000; 2001). The percentage of single centers varied from 10 percent (NMSU 99-28) to 68 percent ('NuMex Chaco') (table 2). The percentage of single-centered bulbs generally was lower in 2001 than in previous years (Cramer et al., 2000; 2001). The reduction in single-center percentage likely resulted from an increase in bulb size.

Intermediate maturity. For the intermediate-maturing entries, maturity date ranged from May 29 to June 5, 2001 (table 3). The average bolting incidence generally was low (3.1 percent), and less bolting was observed for the intermediate-maturing entries than for the early-maturing entries (tables 1 and 3). The seedstalk percentage of 'NuMex Dulce' (11.1 percent) was greater than commercially desired, and the entry should be planted later to reduce seedstalk formation. For those entries that exhibited some bolting, the bolting incidence was greater in 2001 than in previous years (Cramer et al., 2000; 2001).

The mean percentage of bulbs with pink root generally was high (82.3 percent) among entries, while mean pink root severity generally was low (2.4) (table 3). 'Cardinal' was rated as having the most severe pink root symptoms (3.9) and greatest pink root incidence (100.0 percent). As in previous years, 'NuMex Crispy' expressed less pink root damage (1.8) and incidence (56.0 percent) than all entries, except NMSU 98-20 (Cramer et al., 2000; 2001). In 2001, pink root severity and incidence was comparable to last year. However, the severity was much less than in 1999 (Cramer et al., 2000; 2001). FBR incidence and severity generally were low among entries except for 'Cardinal' (table 3). 'Cardinal' had the greatest FBR incidence and severity (5.6 and 75.0 percent, respectively).

The average percentage of marketable bulbs produced by each entry generally was high (91 percent) and not different among entries (table 4). Yield and bulb size were excellent for all entries except 'Cardinal' (table 4). Entries averaged 1,630 sacks (50 lb) per acre with an average bulb size of 18.2 oz. 'NuMex Starlite' produced a greater yield than all entries. The low yield and small bulb size of 'Cardinal' resulted from its high pink root incidence (table 3). Average bulb yield and size were greater in 2001 than in 2000 (1,338 sacks/acre; 15.4 oz) and 1999 (1,238 sacks/acre; 16.3 oz) (Cramer et al., 2000; 2001). The percentage of single-centered bulbs generally was low for all entries, with 'NuMex Starlite' and 'NuMex Dulce' possessing the most single-centered bulbs (table 4). The average percentage of single-centered bulbs was lower in 2001 (24.3 percent) than in 2000 (54.6 percent) or 1999 (48.5 percent) (Cramer et al., 2000; 2001). The reduction in percentage of single-centered bulbs likely resulted from an increase in bulb size.

Late maturity. All of the late-maturing entries matured on June 16, 2001 (table 5). Seedstalk production generally was low (5.0 percent) among the four entries tested, with 'NuMex Luna' producing the greatest percentage of seedstalks (12.1 percent) (table 5). For those entries that produced seedstalks, the average seedstalk percentage was greater in 2001 than last year (Cramer et al., 2001). The mean pink root severity and incidence (1.8, 58.8 percent) and mean FBR severity and incidence (2.0, 29.5 percent) were low among entries, which did not differ in their severity or incidence. Mean pink root incidence and severity were lower than earlier-maturing entries (tables 1 and 3) and were lower than the same entries grown in previous years (Cramer et al., 1998; 2000; 2001). FBR incidence of these entries (table 5) generally was lower than the incidence of earlier-maturing entries (tables 1 and 3).

The mean percentage of marketable bulbs generally was high (93 percent) among entries with no difference among entries (table 6). The average marketable bulb yield was high (1,683 sacks/acre), and bulb size was quite large (19.9 oz) (table 6). Bulb yield and size were greater than yield and size of earlier-maturing entries (tables 2 and 4), and mean bulb yield of these entries was greater in 2001 than in previous years (Cramer et al., 1998; 2000; 2001). The average bulb size in 2001 (19.9 oz) was greater than 2000 (15.3 oz) and comparable to 1999 (20.3 oz) (Cramer et al., 2000; 2001). The average percentage of single-centered bulbs generally was low (50.5 percent) with 'NuMex Solano' producing the greatest percentage of single-centered bulbs (table 6). The percentage of single-centered bulbs was lower in 2001 than in 1999 (62.3 percent) and 2000 (55.8 percent) (Cramer et al., 2000; 2001), which may be due to the increase in bulb size. These entries generally produced a higher percentage of single-centered bulbs than earlier-maturing bulbs (tables 2 and 4).

Transplant Trial

Main maturity. Maturity dates of transplanted, main maturity trial entries ranged from June 11 to 26, 2001, with an average maturity date of June 19 (table 7). Several entries matured at a time between the maturity time of the late-maturing, fall-seeded entries (table 5) and that of the early-maturing, spring-seeded entries (table 11). Mean pink root severity of these entries generally was low (1.7), and incidence was variable among entries (table 7). Pink root severity and incidence were lower in 2001 than in previous years (Cramer et al., 2000; 2001). For entries that also were planted in the fall-seeded, intermediate-maturing trial, the pink root incidence and severity were lower when they were transplanted (table 7) than when they were seeded directly (table 3). Mean FBR severity and incidence generally were low (1.1 and 2.3 percent, respectively), and entries did not differ in their severity or incidence (table 7). FBR incidence was lower in 2001 than the previous year (Cramer et al., 2001). For all entries, FBR incidence and severity generally were lower when the entries were transplanted (table 7) than when direct-seeded (tables 3, 5, 11).

The mean percentage of marketable bulbs generally was high (99 percent) with several entries producing 100 percent marketable bulbs (table 8). Bulb yield was variable among entries and generally high (1,258 sacks/acre) (table 8). 'Candy', NMSU 98-31 and 'NuMex Freedom' produced high bulb yields, while 'NuMex Solano' had a low yield. Bulb yield was greater in 2001 (1,258 sacks/acre) than in 2000 (717 sacks/acre) and 1999 (1,083 sacks/acre) (Cramer et al., 2000; 2001). Bulb size, which was variable among entries, generally was large (13.6 oz average) for transplants (table 8). NMSU 98-31 and 'NuMex Freedom' produced the largest bulbs, while 'NuMex Solano' had the smallest bulbs. Bulb size of entries tested in 2001 was larger than in 2000 (7.8 oz) but smaller than in 1999 (16.7 oz) (Cramer et al., 2000; 2001). For entries that also were fall-seeded, bulb yield and size generally were greater when direct-seeded (tables 4 and 6) than when transplanted (table 8). For entries that also were spring-seeded, bulb yield and size generally were greater when transplanted (table 8) than when direct-seeded (table 12). The percentage of single-centered bulbs was variable among entries (table 8). 'NuMex Bolo', 'NuMex Casper' and 'NuMex Freedom' produced the highest percentage of single-centered bulbs, while 'NuMex Starlite' produced the lowest percentage of single-centered bulbs.

Late maturity. For the late-maturing transplant entries, maturity date ranged from July 1 to 8, 2001 (table 9). Mean pink root severity generally was low (2.3), while mean incidence was high (78.5 percent) (table 9). NMSU 00-28-1 and 'NuMex Arthur' had a low pink root severity and incidence. Mean FBR severity and incidence were low and not different among entries (table 9). The percentage and average marketable yield were high for all entries (table 10). 'NuMex Arthur' and 'NuMex Centric' produced a high bulb yield. Bulb yield was greater in 2001 (1,463 sacks/acre) than in 1999 (856 sacks/acre) (Cramer et al., 2000). Average bulb size was large (15.8 oz) with 'NuMex Arthur' and 'NuMex Centric' producing the largest bulbs (table 10). Bulb yield and size of these entries generally were greater when the entries were transplanted than when direct-seeded (tables 14 and 16). The mean percentage of single-centered bulbs produced generally was high (77.8 percent) for all entries, with NMSU 00-28-1 producing the lowest percentage of single-centered bulbs (66.0 percent) (table 10). The percentage of single-centered bulbs was higher in 2001 than in 1999 (60.2 percent) (Cramer et al., 2000).

Spring-Seeded Trial

Early maturity. Maturity dates of the early-maturing, spring-seeded entries ranged from June 27 to July 10, 2001, with an average maturity date of July 4, 2001 (table 11). The average maturity date was two weeks earlier than in 1999 (July 23) (Cramer et al., 2000). Entries differed in the average number of plants per plot, with HSO 102 producing the fewest plants (38), and 'NuMex Bolo' producing the greatest (50) (table 11). Pink root severity generally was low among entries. However, HSO 102 and 'Stansa' had more severe pink root symptoms than all other entries except 'Hidalgo' (table 11). Pink root incidence was variable among entries, with several entries exhibiting pink root on all bulbs (table 11). Pink root severity was lower in 2001 than in 1999 (4.6) (Cramer et al., 2000). Mean FBR severity and incidence were low among entries (1.3 and 9.4 percent) (table 11). PS 9502's FBR severity was higher than that of all other entries except HSO 102. PS 9502's FBR incidence was higher than that of all other entries except HSO 102 and 'NuMex Jose Fernandez'.

The percent marketable yield was high for all entries except 'Hidalgo' (table 12). Bulb yield and size were variable among entries (table 12). 'NuMex Jose Fernandez' and REZ 200 produced a bulb yield greater than all entries except 'Musica'. HSO 102, PS 9502 and 'Stansa' produced the lowest bulb yield. Several entries produced large bulbs, while HSO 102, PS 9502 and 'Stansa' produced the smallest bulbs. Bulb yield and size were lower in 2001 (795 sacks/acre and 9.0 oz) than in 1999 (829 sacks/acre and 10.3 oz) (Cramer et al., 2000). Entries were variable for the single-centered bulb percentage (table 12). 'NuMex Bolo', 'NuMex Jose Fernandez', and REZ 200 produced the highest percentage of single-centered bulbs, while 'Expression', 'Hidalgo', 'Musica' and 'Stansa' produced the lowest percentages.

Intermediate maturity. The average maturity of the intermediate-maturing, spring-seeded entries was July 12, 2001 (table 13). 'NuMex Casper' matured 10 days earlier than normal and three weeks earlier than in 1999 (Cramer et al., 2000). Mean pink root severity was low among entries (2.0), while pink root incidence was variable among entries (table 13). 'NuMex Casper' had a low pink root severity (1.3) and incidence (30.0 percent). Pink root severity was lower in 2001 (2.0) than in 1999 (4.6) (Cramer et al., 2000). FBR severity was low for all entries, and FBR incidence was low for all entries except 'Candy' (16.0 percent) (table 13).

The percentage of marketable bulbs was very high (99 percent), with several entries producing 100 percent marketable bulbs (table 14). Percent marketable yield was higher in 2001 (99 percent) than in 1999 (90 percent) (Cramer et al., 2000). Marketable bulb yield and bulb size were variable among entries (table 14). 'Utopia' produced a high yield and large bulbs (1,010 sacks/acre, 10.6 oz), while 'NuMex Casper' produced a low yield and small bulbs (798 sacks/acre, 8.3 oz). Bulb yield and size were smaller in 2001 (901 sacks/acre, 9.6 oz) than in 1999 (994 sacks/acre, 11.3 oz) (Cramer et al., 2000). The percentage of single-centered bulbs was high for most entries, with an average of 72 percent single-centered bulbs (table 14). The percentage of single centers was higher in 2001 than in 1999 (54.0 percent) (Cramer et al., 2000). The percentage of single-centered bulbs often is inversely proportional to bulb size.

Late maturity. The average maturity of the late-maturing, spring-seeded entries was July 21, 2001 (table 15). Entries varied in maturity, with 'NuMex Arthur' and 'Riviera' maturing one to two weeks earlier than other entries. Both of these entries normally mature later. In 1999, the latest-maturing entries matured two to three weeks later than the same entries tested in 2001 (Cramer et al., 2000). 'NuMex Arthur' produced more plants per plot than the other entries in this maturity class except NMSU 00-32 (table 15). Pink root severity and incidence were variable among entries (table 15). 'NuMex Centric' had the highest pink root severity (4.2) and several entries exhibited a high pink root incidence. 'NuMex Arthur' and 'Riviera' had the low-

est pink root severity and incidence. Pink root incidences were higher for these late-maturing entries than for entries that matured earlier (tables 11 and 13). Pink root severity was lower in 2001 (2.9 average) than in 1999 (5.4 average) (Cramer et al., 2000). Mean FBR severity was low for all entries (1.3) (table 15). FBR incidence generally was low for all entries (7.4 percent) (table 15).

As with earlier-maturing entries, the mean percent marketable yield was high for all entries (97 percent) (table 16). The last time that these entries were tested, percent marketable yield was lower (84 percent average) (Cramer et al., 2000). Marketable bulb yield generally was high among entries (1,011 sacks/acre) with 'NuMex Snowball' producing the lowest yield (830 sacks/acre) (table 16). Average bulb size was variable among entries with 'NuMex Centric' producing larger bulbs (13.9 oz) than the other entries tested (table 16). The percentage of single-centered bulbs generally was high for entries (70.4 percent average) with 'Riviera' being the one exception (43.0 percent). The percentage of single-centered bulbs was higher in 2001 than in 1999 (57.4 percent) (Cramer et al., 2000).

LITERATURE CITED

Corgan, J.N., M.M. Wall, C.S. Cramer, T. Sammis, B. Lewis, and J. Schroeder. 2000. Bulb onion culture and management. N.M. Coop. Exten. Serv. Circ. 563.

Cramer, C.S. 2000. New Mexico onion varieties. N.M. Coop. Exten. Serv. Circ. 567.

Cramer, C.S., J.N. Corgan, J.L. Mendoza, and M.M. Wall. 2000. 1998-1999 onion variety trials at New Mexico State University. N.M. Agric. Expt. Stn. Res. Rpt. 739.

Cramer, C.S., J.L. Mendoza, and J.N. Corgan. 1998. Fall-seeded onion variety trials at New Mexico State University, p. 299-312. In: R.E. Voss (ed.). Proc. 1998 Natl. Onion (and Other Allium) Res. Conf. Veg. Res. Info. Ctr., Univ. Calif., Davis, Calif.

Cramer, C.S., J.L. Mendoza, and M.M. Wall. 2001. 1999-2000 onion variety trials at New Mexico State University. N.M. Agric. Expt. Stn. Tech. Rpt. 38.

U.S. Dept. Of Agric. 2000. Vg 1-2 (00) b. Vegetables. 1999 Summary. Nat. Agr. Stat. Serv., U.S. Dep. Agr.

Table 1. Bulb maturity, seedstalk production and disease evaluation of fall-seeded, early-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry[z]	Seed source	Harvest date[y]	Maturity date[x]	Seedstalks (%)[w]	Pink root severity rating[v]	Pink root incidence (%)[u]	Fusarium basal rot severity rating[t]	Fusarium basal rot incidence (%)[s]
Daybreak	Shamrock	May 30	May 27	4.5	2.5	89.0	2.2	42.0
Ibex	Shamrock	May 30	May 29	0.5	2.4	79.0	2.9	52.0
NIZ 3700	Vilmorin	May 16	May 15	0.0	5.5	100.0	5.0	98.0
NMSU 00-13-1	NMSU	May 16	May 15	0.0	2.3	98.0	1.4	25.0
NMSU 99-16	NMSU	May 22	May 22	0.0	2.2	91.0	1.3	23.0
NMSU 99-28	NMSU	May 30	May 29	0.0	2.3	83.0	2.4	61.0
NMSU 99-91	NMSU	May 16	May 11	3.0	2.2	93.0	1.5	32.0
NuMex Chaco	NMSU	May 22	May 22	0.0	2.3	98.0	1.6	34.0
NuMex Mesa	NMSU	May 22	May 22	0.5	2.3	95.0	1.3	19.0
NuMex Sweetpak	NMSU	May 22	May 19	12.3	2.3	90.0	1.8	38.0
Texas Early White	Seminis	May 22	May 22	19.6	2.1	91.0	1.5	27.0
Mean			May 21	3.7	2.6	91.5	2.1	41.0
LSD (5 %)			2 days***	5.5***	0.3***	NS	0.6***	15.4***

NS, ***Nonsignificant at $P = 0.05$, significant at $P = 0.001$, respectively.
[z]All entries have yellow skin, except NMSU 99-28, NMSU 99-91 and 'Texas Early White', which have white skin.
[y]An entry was harvested when all four replications had 80 percent or more of their tops down within the plot.
[x]A plot was considered matured when 80 percent of the tops were down.
[w]The percentage of seedstalks was determined at harvest and calculated by dividing the number of plants with seedstalks by the total number of plants per plot.
[v]Root systems of 25 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).
[u]Percentage of bulbs with pink root.
[t]Cut basal plates of 25 bulbs per plot were rated based on a scale of 1 (no disease tissue) to 9 (70 percent or more of basal plate decayed).
[s]Percentage of bulbs with Fusarium basal plate rot.

Table 2. Yield performance of fall-seeded, early-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry	Marketable yield (%)[z]	Marketable yield (Number of 50 lb sacks/acre)[y]	Average bulb weight (oz)[x]	Single centers (%)[w]
Daybreak	81	1,412	17.1	21.0
Ibex	82	1,452	16.2	18.0
NIZ 3700	93	848	9.3	27.0
NMSU 00-13-1	97	1,222	13.5	64.0
NMSU 99-16	96	1,498	15.8	63.0
NMSU 99-28	81	976	12.3	10.0
NMSU 99-91	90	1,044	11.2	57.0
NuMex Chaco	93	1,490	15.4	68.0
NuMex Mesa	95	1,522	15.9	39.0
NuMex Sweetpak	89	1,362	17.1	42.0
Texas Early White	90	927	12.2	61.0
Mean	90	1,250	14.2	42.7
LSD (5%)	7***	129***	1.8***	14.1***

***Significant at $P = 0.001$.
[z]Percentage of marketable yield was calculated by dividing marketable bulb weight by total bulb weight.
[y]Marketable bulb yield (number of 50 lb sacks produced per acre) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 acre.
[x]Average bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.
[w]The percentage of bulbs with single centers (single growing points) was determined by cutting each bulb transversely at the vertical center and measuring the number of growing points that extended 0.5 in. beyond the bulb's center.

Table 3. Bulb maturity, seedstalk production and disease evaluation of fall-seeded, intermediate-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry[z]	Seed source	Harvest date[y]	Maturity date[x]	Seedstalks (%)[w]	Pink root severity rating[v]	Pink root incidence (%)[u]	Fusarium basal rot severity rating[t]	Fusarium basal rot incidence (%)[s]
Cardinal	Shamrock	May 30	May 29	0.0	3.9	100.0	5.6	75.0
NMSU 98-20	NMSU	June 7	June 4	0.5	1.8	69.0	2.1	44.0
NuMex Crispy	NMSU	May 30	May 29	6.1	1.8	56.0	2.4	62.0
NuMex Dulce	NMSU	June 7	June 4	11.1	2.5	96.0	1.6	24.0
NuMex Starlite	NMSU	June 7	June 4	0.0	2.2	80.0	1.5	25.0
NuMex Vado	NMSU	June 7	June 5	1.1	2.4	93.0	2.0	35.0
Mean			June 2	3.1	2.4	82.3	2.5	44.2
LSD (5%)			3 days***	2.9***	0.4***	15.3***	0.6***	28.2**

**, ***Significant at $P = 0.01$, $P = 0.001$, respectively.
[z]All entries have yellow skin, except NMSU 98-20 and 'NuMex Crispy', which have white skin, and 'Cardinal', which has red skin.
[y]An entry was harvested when all four replications had 80 percent or more of their tops down within the plot.
[x]A plot was considered matured when 80 percent of the tops were down.
[w]The percentage of seedstalks was determined at harvest and calculated by dividing the number of plants with seedstalks by the total number of plants per plot.
[v]Root systems of 25 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).
[u]Percentage of bulbs with pink root.
[t]Cut basal plates of 25 bulbs per plot were rated based on a scale of 1 (no disease tissue) to 9 (70 percent or more of basal plate decayed).
[s]Percentage of bulbs with Fusarium basal plate rot.

Table 4. Yield performance of fall-seeded, intermediate-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry	Marketable yield (%)[z]	Marketable yield (Number of 50 lb. sacks/acre)[y]	Average bulb weight (oz)[x]	Single centers (%)[w]
Cardinal	90	1,118	12.7	18.0
NMSU 98-20	94	1,827	20.8	15.0
NuMex Crispy	93	1,423	14.9	27.0
NuMex Dulce	86	1,694	19.9	33.0
NuMex Starlite	93	1,966	21.6	40.0
NuMex Vado	93	1,752	19.4	13.3
Mean	91	1,630	18.2	24.3
LSD (5%)	NS	109***	1.7***	16.6*

[NS,] *, ***Nonsignificant at $P = 0.05$, significant at $P = 0.05$, $P = 0.001$, respectively.
[z]Percentage of marketable yield was calculated by dividing marketable bulb weight by total bulb weight.
[y]Marketable bulb yield (number of 50 lb sacks produced per acre) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 acre.
[x]Average bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.
[w]The percentage of bulbs with single centers (single growing points) was determined by cutting each bulb transversely at the vertical center and measuring the number of growing points that extended 0.5 in. beyond the bulb's center.

Table 5. Seedstalk production and disease evaluation of fall-seeded, late-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry[z]	Seedstalks (%)[y]	Pink root severity rating[x]	Pink root incidence (%)[w]	Fusarium basal rot severity rating [v]	Fusarium basal rot incidence (%)[u]
NMSU 99-24	6.2	1.7	56.0	2.2	31.0
NuMex Freedom	0.5	1.6	46.0	1.7	25.0
NuMex Luna	12.1	2.0	70.0	2.3	36.0
NuMex Solano	1.1	1.8	63.0	1.7	26.0
Mean	5.0	1.8	58.8	2.0	29.5
LSD (5%)	4.9**	NS	NS	NS	NS

NS,**Nonsignificant at $P = 0.05$, significant at $P = 0.01$, respectively.

[z]All entries have yellow skin, except 'NuMex Solano', which has white skin. All entries originated from New Mexico State University. All entries were harvested on June 16, 2001, and had the same maturity date. An entry was harvested when all four replications had 80 percent or more of their tops down within the plot. A plot was considered matured when 80 percent of the tops were down.

[y]The percentage of seedstalks was determined at harvest and calculated by dividing the number of plants with seedstalks by the total number of plants per plot.

[x]Root systems of 25 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).

[w]Percentage of bulbs with pink root.

[v]Cut basal plates of 25 bulbs per plot were rated based on a scale of 1 (no disease tissue) to 9 (70 percent or more of basal plate decayed).

[u]Percentage of bulbs with Fusarium basal plate rot.

Table 6. Yield performance of fall-seeded, late-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry	Marketable yield (%)[z]	Marketable yield (Number of 50 lb sacks/acre) [y]	Average bulb weight (oz)[x]	Single centers (%)[w]
NMSU 99-24	94	1,948	22.7	54.2
NuMex Freedom	92	1,746	21.1	50.8
NuMex Luna	90	1,698	20.6	28.5
NuMex Solano	94	1,339	15.0	68.7
Mean	93	1,683	19.9	50.5
LSD (5%)	NS	267**	1.8***	11.4***

NS, **, ***Nonsignificant at $P = 0.05$, significant at $P = 0.01$, P = 0.001, respectively.

[z]Percentage of marketable yield was calculated by dividing marketable bulb weight by total bulb weight.

[y]Marketable bulb yield (number of 50 lb sacks produced per acre) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 acre.

[x]Average bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.

[w]The percentage of bulbs with single centers (single growing points) was determined by cutting each bulb transversely at the vertical center and measuring the number of growing points that extended 0.5 in. beyond the bulb's center.

Table 7. Bulb maturity and disease evaluation of transplanted, main maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry[z]	Seed source	Harvest date[y]	Maturity date[x]	Pink root severity rating[w]	Pink root incidence (%)[v]	Fusarium basal rot severity rating[u]	Fusarium basal rot incidence (%)[t]
Candy	Seminis	June 25	June 26	1.8	71.0	1.2	4.0
Cimarron	Sunseeds	June 17	June 17	1.5	40.0	1.4	6.0
NMSU 98-31	NMSU	June 25	June 26	1.8	64.0	1.0	1.0
NMSU 99-24	NMSU	June 20	June 19	1.4	34.0	1.1	2.0
NuMex Bolo	NMSU	June 20	June 18	1.5	42.0	1.2	3.0
NuMex Casper	NMSU	June 25	June 22	1.6	54.0	1.1	3.0
NuMex Dulce	NMSU	June 20	June 19	1.7	49.0	1.0	1.0
NuMex Freedom	NMSU	June 25	June 24	2.2	95.0	1.0	1.0
NuMex Jose Fernandez	NMSU	June 25	June 25	1.8	68.0	1.2	2.0
NuMex Luna	NMSU	June 25	June 26	2.3	87.0	1.0	0.0
NuMex Solano	NMSU	June 25	June 24	1.9	75.0	1.1	5.0
NuMex Starlite	NMSU	June 17	June 11	1.3	26.0	1.0	0.0
NuMex Vado	NMSU	June 20	June 19	1.4	33.0	1.0	2.0
Mean			June 19	1.7	59.3	1.1	2.3
LSD (5%)			2 days***	0.3***	19.8***	NS	NS

NS, ***Nonsignificant at $P = 0.05$, significant at $P = 0.001$, respectively.
[z]All entries have yellow skin, except 'NuMex Casper' and 'NuMex Solano', which have white skin.
[y]An entry was harvested when all four replications had 80 percent or more of their tops down within the plot.
[x]A plot was considered matured when 80 percent of the tops were down.
[w]Root systems of 25 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).
[v]Percentage of bulbs with pink root.
[u]Cut basal plates of 25 bulbs per plot were rated based on a scale of 1 (no disease tissue) to 9 (70 percent or more of basal plate decayed).
[t]Percentage of bulbs with Fusarium basal plate rot.

Table 8. Yield performance of transplanted, main maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry	Marketable yield (%)[z]	Marketable yield (Number of 50 lb sacks/acre) [y]	Average bulb weight (oz) [x]	Single centers (%)[w]
Candy	98	1,493	16.1	56.0
Cimarron	99	1,301	14.6	28.0
NMSU 98-31	99	1,581	16.6	62.0
NMSU 99-24	96	1,132	15.6	44.0
NuMex Bolo	99	1,274	14.0	72.0
NuMex Casper	98	1,306	13.4	82.0
NuMex Dulce	100	1,146	11.5	53.0
NuMex Jose Fernandez	98	1,261	13.7	50.0
NuMex Freedom	98	1,594	18.2	81.0
NuMex Luna	100	1,387	14.3	42.0
NuMex Solano	95	837	9.0	43.0
NuMex Starlite	100	1,200	12.9	11.0
NuMex Vado	98	1,103	11.6	39.0
Mean	99	1,258	13.6	48.6
LSD (5%)	2**	122***	1.0***	15.5***

**, ***Significant at $P = 0.01$, $P = 0.001$, respectively.
[z]Percentage of marketable yield was calculated by dividing marketable bulb weight by total bulb weight.
[y]Marketable bulb yield (number of 50 lb sacks produced per acre) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 acre.
[x]Average bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.
[w]The percentage of bulbs with single centers (single growing points) was determined by cutting each bulb transversely at the vertical center and measuring the number of growing points that extended 0.5 in. beyond the bulb's center.

Table 9. Bulb maturity and disease evaluation of transplanted, late-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry[z]	Harvest date[y]	Maturity date[x]	Pink root severity rating[w]	Pink root incidence (%)[v]	Fusarium basal rot severity rating[u]	Fusarium basal rot incidence (%)[t]
NMSU 00-28-1	July 1	July 1	1.7	60.0	1.2	9.0
NuMex Arthur	July 1	July 1	2.0	69.0	1.0	3.0
NuMex Centric	July 9	July 6	2.9	98.0	1.1	4.0
NuMex Snowball	July 9	July 8	2.5	87.0	1.3	11.0
Mean		July 4	2.3	78.5	1.2	6.8
LSD (5%)		3 days**	0.6**	27.1*	NS	NS

NS, *, **Nonsignificant at $P = 0.05$, significant at $P = 0.05$ and $P = 0.01$, respectively.
[z]'NuMex Arthur' and 'NuMex Centric' have yellow skin, while NMSU 00-28-1 and 'NuMex Snowball' have white skin. All entries are from New Mexico State University.
[y]An entry was harvested when all four replications had 80 percent or more of their tops down within the plot.
[x]A plot was considered matured when 80 percent of the tops were down.
[w]Root systems of 25 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).
[v]Percentage of bulbs with pink root.
[u]Cut basal plates of 25 bulbs per plot were rated based on a scale of 1 (no disease tissue) to 9 (70 percent or more of basal plate decayed).
[t]Percentage of bulbs with Fusarium basal plate rot.

Table 10. Yield performance of transplanted, late-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry	Marketable yield (%)[z]	Marketable yield (Number of 50 lb sacks/acre)[y]	Average bulb weight (oz)[x]	Single centers (%)[w]
NMSU 00-28-1	95	1,269	13.4	66.0
NuMex Arthur	99	1,644	17.4	81.0
NuMex Centric	98	1,536	17.6	81.0
NuMex Snowball	98	1,403	14.7	83.0
Mean	98	1,463	15.8	77.8
LSD (5%)	NS	177**	1.4***	7.6**

NS, **, ***Nonsignificant at $P = 0.05$, significant at $P = 0.01$ and $P = 0.001$, respectively.
[z]Percentage of marketable yield was calculated by dividing marketable bulb weight by total bulb weight.
[y]Marketable bulb yield (number of 50 lb sacks produced per acre) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 acre.
[x]Average bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.
[w]The percentage of bulbs with single centers (single growing points) was determined by cutting each bulb transversely at the vertical center and measuring the number of growing points that extended 0.5 in. beyond the bulb's center.

Table 11. Bulb maturity and disease evaluation of spring-seeded, early-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry[z]	Seed source	Harvest date[y]	Maturity date[x]	Plants/ plot	Pink root severity rating[w]	Pink root incidence (%)[v]	Fusarium basal rot severity rating[u]	Fusarium basal rot incidence (%)[t]
Caballero	Seminis	July 3	July 4	41	2.1	67.0	1.3	8.0
Cimarron	Sunseeds	June 29	June 29	49	1.5	47.0	1.3	14.0
Expression	Bejo	July 3	July 4	44	1.7	52.0	1.0	1.0
Hidalgo	Bejo	July 27	July 29	40	3.1	100.0	1.3	8.0
HSO 102	Emerald	July 13	July 8	38	3.4	99.0	1.6	21.0
Musica	Bejo	July 3	July 2	48	2.4	86.0	1.0	2.0
Navigator	Sunseeds	July 3	July 2	43	2.2	78.0	1.1	5.0
NuMex Bolo	NMSU	June 29	June 28	50	1.4	37.0	1.2	9.0
NuMex Jose Fernandez	NMSU	July 3	July 2	47	1.9	61.0	1.2	17.0
NuMex Luna	NMSU	July 3	June 29	46	2.6	93.0	1.0	0.0
PS 9502	Seminis	June 29	June 27	42	1.8	54.0	2.0	29.0
REZ 200	Seminis	July 13	July 10	49	1.9	61.0	1.2	7.0
Sierra Blanca	Seminis	July 3	July 2	42	2.7	92.0	1.1	3.0
Stansa	Bejo	July 3	July 2	43	3.2	100.0	1.3	7.0
Mean			July 4	44	2.3	73.4	1.3	9.4
LSD (5%)			4 days***	7*	0.5***	20.2***	0.4***	14.9*

*, ***Significant at $P = 0.05$, $P = 0.001$, respectively.
[z]All entries have yellow skin, except 'Sierra Blanca', which has white skin.
[y]An entry was harvested when all four replications had 80 percent or more of their tops down within the plot.
[x]A plot was considered matured when 80 percent of the tops were down.
[w]Root system of 25 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).
[v]Percentage of bulbs with pink root.
[u]Cut basal plates of 25 bulbs per plot were rated based on a scale of 1 (no disease tissue) to 9 (70 percent or more of basal plate decayed).
[t]Percentage of bulbs with Fusarium basal plate rot.

Table 12. Yield performance of spring-seeded, early-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry	Marketable yield (%)[z]	Marketable yield (Number of 50 lb sacks/acre) [y]	Average bulb weight (oz) [x]	Single centers (%)[w]
Caballero	100	796	9.7	65.0
Cimarron	99	859	8.8	72.0
Expression	99	839	9.6	33.0
Hidalgo	75	726	10.9	12.0
HSO 102	97	413	5.4	54.0
Musica	100	959	9.9	10.0
Navigator	97	895	10.6	53.0
NuMex Bolo	98	866	8.8	91.0
NuMex Jose Fernandez	100	994	10.4	89.0
NuMex Luna	98	771	8.4	52.0
PS 9502	99	586	6.9	75.0
REZ 200	99	1,087	11.0	83.0
Sierra Blanca	99	785	9.2	67.0
Stansa	99	557	6.4	31.0
Mean	97	795	9.0	56.2
LSD (5%)	4***	106***	1.3***	15.6***

***Significant at $P = 0.001$.
[z]Percentage of marketable yield was calculated by dividing marketable bulb weight by total bulb weight.
[y]Marketable bulb yield (number of 50 lb sacks produced per acre) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 acre.
[x]Average bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.
[w]The percentage of bulbs with single centers (single growing points) was determined by cutting each bulb transversely at the vertical center and measuring the number of growing points that extended 0.5 in. beyond the bulb's center.

Table 13. Bulb maturity and disease evaluation of spring-seeded, intermediate-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry[z]	Seed source	Harvest date[y]	Maturity date[x]	Pink root severity rating[w]	Pink root incidence (%)[v]	Fusarium basal rot severity rating[u]	Fusarium basal rot incidence (%)[t]
Candy	Seminis	July 17	July 15	2.7	97.0	1.3	16.0
NMSU 00-28-1	NMSU	July 13	July 15	1.7	53.0	1.1	3.0
NMSU 00-31	NMSU	July 13	July 14	2.0	68.0	1.0	0.0
NuMex Casper	NMSU	July 3	July 3	1.3	30.0	1.1	5.0
Utopia	Seminis	July 13	July 13	2.2	79.0	1.1	4.0
Mean			July 12	2.0	65.4	1.1	5.6
LSD (5%)			2 days***	0.5***	25.1***	NS	7.4**

[NS, **, ***]Nonsignificant at $P = 0.05$, significant at $P = 0.01$ and $P = 0.001$, respectively.
[z]All entries have yellow skin, except NMSU 00-28-1 and 'NuMex Casper', which have white skin.
[y]An entry was harvested when all four replications had 80 percent or more of their tops down within the plot.
[x]A plot was considered matured when 80 percent of the tops were down.
[w]Root systems of 25 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).
[v]Percentage of bulbs with pink root.
[u]Cut basal plates of 25 bulbs per plot were rated based on a scale of 1 (no disease tissue) to 9 (70 percent or more of basal plate decayed).
[t]Percentage of bulbs with Fusarium basal plate rot.

Table 14. Yield performance of spring-seeded, intermediate-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry	Marketable yield (%)[z]	Marketable yield (Number of 50 lb sacks/acre) [y]	Average bulb weight (oz) [x]	Single centers (%)[w]
Candy	98	886	10.3	69.0
NMSU 00-28-1	100	859	9.0	80.0
NMSU 00-31	100	954	9.9	79.0
NuMex Casper	97	798	8.3	83.0
Utopia	100	1,010	10.6	50.0
Mean	99	901	9.6	72.2
LSD (5%)	2*	131*	1.1**	10.8***

*, **, ***Significant at $P = 0.05$, $P = 0.01$, $P = 0.001$, respectively.
[z]Percentage of marketable yield was calculated by dividing marketable bulb weight by total bulb weight.
[y]Marketable bulb yield (number of 50 lb sacks produced per acre) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 acre.
[x]Average bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.
[w]The percentage of bulbs with single centers (single growing points) was determined by cutting each bulb transversely at the vertical center and measuring the number of growing points that extended 0.5 in. beyond the bulb's center.

Table 15. Bulb maturity and disease evaluation of spring-seeded, early-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry[z]	Seed source	Harvest date[y]	Maturity date[x]	Plants /plot	Pink root severity rating[w]	Pink root incidence (%)[v]	Fusarium basal rot severity rating[u]	Fusarium basal rot incidence (%)[t]
NMSU 00-32	NMSU	July 27	July 27	43	3.4	100.0	1.1	3.0
NuMex Arthur	NMSU	July 13	July 14	49	2.1	67.0	1.1	1.0
NuMex Centric	NMSU	July 27	July 23	40	4.2	100.0	1.6	13.0
NuMex Snowball	NMSU	July 27	July 28	38	2.9	99.0	1.6	17.0
Riviera	Seminis	July 13	July 14	42	2.1	64.0	1.1	3.0
Mean			July 21	43	2.9	86.0	1.3	7.4
LSD (5%)			4 days***	6*	0.5***	19.1**	NS	11.3*

NS, *, **, ***Nonsignificant at $P = 0.05$, significant at $P = 0.05$, $P = 0.01$ and $P = 0.001$, respectively.
[z]All entries have yellow skin, except 'NuMex Snowball', which has white skin.
[y]An entry was harvested when all four replications had 80 percent or more of their tops down within the plot.
[x]A plot was considered matured when 80 percent of the tops were down.
[w]Root systems of 25 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).
[v]Percentage of bulbs with pink root.
[u]Cut basal plates of 25 bulbs per plot were rated based on a scale of 1 (no disease tissue) to 9 (70 percent or more of basal plate decayed).
[t]Percentage of bulbs with Fusarium basal plate rot.

Table 16. Yield performance of spring-seeded, late-maturing entries in the 2000-2001 onion trial at Fabian Garcia Research Center in Las Cruces, N.M.

Entry	Marketable yield (%)[z]	Marketable yield (Number of 50 lb sacks/acre) [y]	Average bulb weight (oz) [x]	Single centers(%)[w]
NMSU 00-32	98	1,040	12.0	74.0
NuMex Arthur	99	1,056	10.7	85.0
NuMex Centric	98	1,123	13.9	81.0
NuMex Snowball	94	830	11.0	69.0
Riviera	99	1,004	11.9	43.0
Mean	97	1,011	11.9	70.4
LSD (5%)	NS	154*	1.3**	10.2***

NS, *, **, ***Nonsignificant at $P = 0.05$, significant at $P = 0.05$, $P = 0.01$ and $P = 0.001$, respectively.
[z]Percentage of marketable yield was calculated by dividing marketable bulb weight by total bulb weight.
[y]Marketable bulb yield (number of 50 lb sacks produced per acre) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 acre.
[x]Average bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.
[w]The percentage of bulbs with single centers (single growing points) was determined by cutting each bulb transversely at the vertical center and measuring the number of growing points that extended 0.5 in. beyond the bulb's center.

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