The New Mexico State Univ. Agricultural Experiment Station announces the release of ‘NuMex Whisper’ onion (Allium cepa L.). ‘NuMex Whisper’ is an open-pollinated, single-centered, late-maturing, intermediate-day, yellow skin onion cultivar for fall sowing in southern New Mexico and similar environments. ‘NuMex Whisper’ matures in mid-June to early July when fall-sown in Las Cruces, NM.

Origin

‘NuMex Whisper’ originates from intercrosses among germplasm derived from short-, intermediate-, and long-day onion cultivars and PI accessions (Fig. 1). The short-day cultivars were Buffalo, Texas Early Grano 502 PRR, and a bolting-resistant selection of Texas Early Grano 502 PRR (Texas Early Grano 502 PRR BR). In addition, two PI accessions from the U.S. onion germplasm collection in Geneva, NY, PI 124525 (PI 2) and PI 275964 (PI 3), were used. The lone intermediate-day cultivar was Ben Shemen. The long-day germplasm included ‘Peckham Yellow Sweet Spanish’ and a PI accession, PI 249538 (PI 1).

‘Ben Shemen’ originated in Israel from a selection known as ‘Riverside’, which was thought to be a selection from ‘Yellow Sweet Spanish’ (Corgan, 1995). ‘Yellow Sweet Spanish’ was selected from ‘Riverside Sweet Spanish’ that was introduced from Spain in 1916 (Cramer and Corgan, 2003). ‘Buffalo’ is a Japanese overwintering, short-day onion that possesses high-quality, yellow dry outer scales and exhibits susceptibility to pink root [causal organism, Phoma terrestris (Hansen)] and fusarium basal rot [causal agent, Fusarium oxysporum f. sp. cepae (H.N. Hans.) W.C. Snyder & H.N. Hans] (Cramer, 2000). PI 124525 was collected from India in June 1937 by W. Koelz (USDA, ARS, National Genetic Resources Program, 2013a). The accession produces bulbs that are oval-shaped and possess red-colored outer dry scales (USDA, ARS, National Genetic Resources Program, 2013b). PI 249538 was collected from the Seed Testing and Control Station in Helandrion, Attike, Greece, on 1 Jan. 1958 by H. Gentry (USDA, ARS, National Genetic Resources Program, 2013c). The accession produces bulbs that are globe-shaped and possess red-colored outer dry scales (USDA, ARS, National Genetic Resources Program, 2013d). PI 275964 was donated by the Office of Agricultural Attache in Greece on 15 Dec. 1961 (USDA, ARS, National Genetic Resources Program, 2013e). The accession produces bulbs that are flat-shaped and possess red-colored outer dry scales (USDA, ARS, National Genetic Resources Program, 2013f). ‘Texas Early Grano 502 PRR’, whose origin and description has been described previously (Corgan, 1984; Cramer and Corgan, 2003; Garcia and Fite, 1931; Hawthorn, 1944), is a short-day, yellow-scaled onion that originated from ‘New Mexico Early Grano’. ‘Peckham Yel- low Sweet Spanish’ is a selection out of ‘Yellow Sweet Spanish’ (Cramer and Corgan, 2003).

In the typical life cycle of short-day, overwintering onion cultivars, seed is sown in September or October, whereas seed of intermediate-day cultivars are often sown in February. Bulbs are harvested in June or July of the next year (current year for intermediate-day cultivars) at which time selection is usually performed. Harvested bulbs remain dormant for 2 to 3 months and then begin to sprout. Sprouting bulbs are planted in Septem-ber or October for seed production in the next year. In May of the next year, pollinators such as honeybees (Apis mellifera) or blue bottle flies (Calliphora vomitoria) are added to crossing cages to pollinate flowers. Seed is usually ready to be harvested by July and can be sown in August or September. Harvested seed can be combined together from all plants within the crossing cage or kept separate from each plant.

In 1978, bulb selections were made from ‘Texas Early Grano 502 PRR BR’ and those bulbs were placed in a crossing cage designated 79-2 (Fig. 1, track 1). In 1980, bulb selections were made from NMSU 79-2 and each bulb was placed a single cage. In the fall of 1981, seed from each of those self-pollinated lines, collectively designated as NMSU 81-5C, was sown. In June of 1982, bulbs were selected from each self-pollinated line for later bulb maturity; fewer pink root symptoms when plants were grown in a soil that contained high levels of the causal organism, greater bulb height, and improved bulb firmness when bulbs were hand-squeezed. Bulb selections from each breeding line resulted in 107 bulbs that were placed together in a crossing cage numbered 83-62. In June of 1985, six bulbs from NMSU 83-62 were selected and placed in a crossing cage designated 86-1038 as the second entry in the cage (-2) as illustrated in Figure 1.

In May of 1981, crosses were made between bulbs of ‘Peckham Yellow Sweet Spanish’ and three PI accessions (PI 1, 2, 3) (Fig. 1, track 2). Those bulbs, that derived from ‘Peckham Yellow Sweet Spanish’ as the maternal parent, were the second entry (-2) within the crossing cage. Soon after seed was harvested, seed of NMSU 81-16-2 was sown so that it would flower the next year and not be evaluated and/or selected for bulb production. Plants of this line were placed in a crossing cage designated 82-1007. In Feb. 1983, seed of NMSU 82-1007 was sown. In August of 1983, 19 bulbs were selected that were yellow in color, expressed fewer pink root symptoms, and possessed numerous, long and healthy roots. These selected bulbs were placed in a crossing cage designated 84-26. In Feb. 1985, seed of NMSU 84-26 was sown. In July of 1985, seven bulbs from NMSU 84-26 were selected that expressed fewer pink root symptoms and earlier maturity. These selected bulbs were placed as the first entry (-1) in a crossing cage designated 86-1038. In July of 1987, bulbs, that were later in maturity than other bulbs, were selected from 86-1038-1 and 86-1038-2 (Fig. 1, tracks 1 and 2). These selected bulbs were placed as two separate entries in a crossing cage designated 88-31. In May of 1988, the selected bulbs in cage 88-31 flowered and seed was harvested separately from each entry. In June of 1989, bulbs, that were uniform in maturity, were selected from 88-31-1 and bulbs, that possessed fewer pink root symptoms, were selected from 88-31-2. These selected bulbs were placed as the second and third entries in a crossing cage designated 90-67.

In the summer of 1979, a single bulb was selected from ‘Ben Shemen’ and placed in a crossing cage designated as 80-2-1 (Fig. 1, track 6). In June of 1981, yellow bulbs, that possessed fewer pink root symptoms and exhibited a more square shape, were selected from NMSU 80-2-1. The bulbs were placed into two separate cages and were given three separate designations, 82-22-1 (Fig. 1, track 4), 82-26-1 (Fig. 1, track 6), and 82-26-2 (Fig. 1, track 7). In June of 1983, bulbs were selected from 82-22-1 and placed in a crossing cage designated 84-1020-2. In the same month, 12 bulbs, that tended to be early in their maturity, were selected from NMSU 82-26-1 and were placed in a crossing cage designated 84-1007. At the same time, six bulbs, that were early in their maturity, possessed fewer pink root symptoms, and tended to be smaller in size, were selected and placed in a crossing cage designated 84-1009. In addition, five bulbs were selected from ‘Buffalo’ and were placed in the same crossing cage as the bulb selection from NMSU 82-22-1. The entry was designated as 84-1020-1 (Fig. 1, track 3). In May of 1984, bulbs in each of the three cages flowered and seed was harvested from each cage. Seed from the two entries in the 84-1020-
cage was kept separate. In June of 1985, 11 bulbs were selected from 84-1020-1 and 11 bulbs were selected from 84-1020-2. These bulbs were placed in a crossing cage designated 86-1027 but were kept separate and labeled as such. In the same month, 15 bulbs, that possessed desirable dry outer scale characteristics and fewer pink root symptoms, were selected from 84-1007 and were placed in a crossing cage designated as 86-1023 (Fig. 1, track 5). An additional 15 bulbs, that were very large in diameter and height, were selected from NMSU 84-1007 and placed in a crossing cage designated as 86-1029 (Fig. 1, track 6). At the same time, 18 bulbs, that exhibited fewer pink root symptoms, were early in maturity, and possessed good dry outer bulb scale characteristics, were selected from 84-1009 and placed in a crossing cage designated 86-1023 (Fig. 1, track 5). An additional 15 bulbs, that were very large in diameter and height, were selected from NMSU 84-1007 and placed in a crossing cage designated 86-1023. In May of 1986, bulbs in each cage flowered and seed was harvested from each cage. In September of 1988, seed of 88-30, 88-32, 88-69, 88-1023, 88-1024, and 88-1032 was sown. In June of 1989, bulbs that had fewer pink root symptoms were selected from 88-30 and placed as the ninth entry in a cage designated 90-67. In the same month, bulbs that were large in size, tended to have greater bulb height, and possessed fewer pink root symptoms were selected from 88-1023 and 88-1024 and placed as the fourth and fifth entries in cage 90-67, respectively. In May of 1980, bulbs of ‘Ben Shemen’ and ‘Texas Early Grano’ were crossed using introduced pollinators (Fig. 1, track 9). Seed was harvested from each entry and was kept separate. The seed from the ‘Ben Shemen’ parent was designated as 80-23-1. In June of 1981, bulbs that were large in size were selected from NMSU 80-23-1 and placed in a crossing cage designated as 82-44. In June of 1983, 25 bulbs, that were large in size and possessed fewer pink root symptoms, were selected from NMSU 82-44 and placed in a crossing cage designated as 84-11. In July of 1985, 13 bulbs, that were large in size and possessed fewer pink root symptoms, were selected from NMSU 84-11 and placed in a crossing cage designated as 86-1031. In July of 1987, bulbs that were early in their maturity, were selected from NMSU 86-1031 and placed in a crossing cage designated as 88-28. In June of 1989, bulbs that were large in size and possessed fewer pink root symptoms were selected from NMSU 88-28 and placed as the first entry in the crossing cage 90-67.

In September of 1989, selections from nine separate lines were placed as separate entries in cage 90-67 (Fig. 1). In May of 1990, pollinators were introduced in the cage and seed was harvested separately from each entry. In July of 1991, bulbs, that were very large in size and round in shape, possessed desirable outer dry scale characteristics, and matured later, were selected from eight of the nine lines. In addition, a second selection for increase pink root resistance was made from a greenhouse seedling screening for pink root susceptibility. These bulb selections were placed as nine separate entries within a cage designated as 92-65. In addition, a second selection for earlier bulb maturity and greater bulb height was made from 90-67-1, 67-2, 67-4, 67-5, 67-6, 67-8, and 67-9. These selections were placed as seven separate entries in a separate crossing cage designated 92-66 (Fig. 1). In May of 1992, plants flowered and seed was harvested separately from each entry. In June of 1993, bulbs, that were later in maturity, were selected from the 16 separate

| Track | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1986 | 1988 | 1990 | 1992 |
|-------|------|------|------|------|------|------|------|------|------|------|------|
| 1     | Texas Early Grano PRR BR | 79-2 | 81-5C | 83-62 | 86-1038-2 | X | X | X | X | 92-65-2 & 92-66-2 |
| 2     | Peckham Yellow Sweet Spanish PRR BR | 81-16-2 | 82-1007 | 84-26 | 86-1038-1 | X | X | 92-65-3 | X |
| 3     | Buffalo | 84-1020-1 | 84-1020-2 | 86-1027-2 | 86-1023 | X | X | X | X | 92-66-5 & 92-66-4 |
| 4     | Ben Shemen | 80-2-1 | 82-26-1 | 84-1007 | 86-1029 | X | X | X | X | 92-66-7 & 92-66-6 |
| 5     | Ben Shemen | 82-26-2 | 84-1009 | 86-1018 | 88-1032 | X | X | X | X | 92-66-5 & 92-66-4 |
| 6     | Ben Shemen | 86-19 | 88-1023 | 86-82-28 | 86-71 | X | X | X | X | 92-66-6 & 92-66-1 |
| 7     | Texas Early Grano PRR BR | 80-23-1 | 82-44 | 84-11 | 86-1031 | 88-28 | 90-67-1 | 92-65-1 & 92-66-1 | | |

Fig. 1. Pedigree of entries used in the development of ‘NuMex Whisper’ from 1978 to 1992.
entries of the two cages. Bulb selections from 92-65-5, -6, -7, -8, 92-66-1, -3, -4, -6, and -7 were bulked together and placed as the first entry in a crossing cage designated as 94-18 (Fig. 2). Bulb selections from 92-65-1, -2, -3, -4, -9, 92-66-2, and -5 were bulked together and placed as the second entry in cage 94-18. In July of 1994, seed was harvested from each entry. In July of 1995, bulbs, that were very large in size, possessed fewer pink root symptoms, and desirable dry outer bulb scale characteristics, were selected from each of two entries. Bulbs, selected from each entry, were placed as separate entries in a crossing cage designated 96-15. In July of 1997, bulbs, that possessed fewer pink root symptoms and a single growing point based on visual observation of the leaf whorl, were selected from NMSU 96-15-1 and 96-15-2. The selected bulbs were bulked together as a single entry in a crossing cage designated as 98-23 (Fig. 2). In June of 2000, bulbs, that were more rounded in shape, possessed better dry outer scale characteristics, and increased bulb firmness when hand-squeezed, were selected from NMSU 98-23 and placed in a crossing cage designated 01-06. In June of 2002, bulbs, that were more round in shape and possessed multiple layers of thin dry outer scale layers, fewer pink root symptoms, and a hard bulb firmness when hand-squeezed, were selected from NMSU 98-23 and placed in a crossing cage designated 03-06-1. In June of 2004, 51 bulbs, that were the most rounded in shape and were hard when hand-squeezed, were selected. The selected bulbs were placed in a crossing cage designated 08-06. In June of 2009, a total of 52 bulbs were selected from NMSU 08-06 in two separate selections. Bulbs, that possessed a single growing point were selected, whereas those that did not were discarded. The selected bulbs were placed in a crossing cage designated 08-06. In June of 2010, pollinators were introduced in the cage and the resulting seed was bulked together. This seed became ‘NuMex Whisper’.

Evaluation Procedures

For 6 years, the experimental line that would become ‘NuMex Whisper’ was compared with ‘NuMex Luna’ in replicated trials grown in several field plots at the NMSU Fabian Garcia Science Center (FGSC) in Las Cruces, NM (Table 1). ‘NuMex Whisper’ was compared with ‘NuMex Luna’ because both cultivars mature at a similar time and ‘NuMex Luna’ is commonly grown by growers in New Mexico to produce onion bulbs that mature in mid to late June. The field soil texture at the FGSC is a Glendale loam and a Brazito very fine sandy loam, thick surface (pH 7.6). Seeds were sown ≈1 to 2 cm deep in two rows 6 cm apart from mid- to late September depending on field location and year. For each two-row plot, 1.5 g of seed was sown and plants were thinned to 10 cm between plants within the row. Each plot was 2.4 m long and 1 m wide and separated by an alley of 0.6 m from the next plot on the same bed. The trials were conducted in randomized complete block designs with four replications. Standard cultural practices to produce fall-sown onions in southern New Mexico were followed (Walker et al., 2009). For Trials 2, 3, 4, 5, 6, and 7, diammonium phosphate (18N–20P–0K; Helena Chemical Co., Collierville, TN) was applied at a rate of 170 kg·ha⁻¹ before seeding as a band 10 cm below the soil surface. Subsurface drip irrigation lines (T Tape; T-Systems International, San Diego, CA), that had emitters every 20 cm, were placed 10 cm deep in the center of each bed. Irrigation was applied as needed. A fish fertilizer (2.2N–4.4P–0.3K–0.2S; Neptune’s Harvest Fertilizer, Gloucester, MA) was applied as needed through the irrigation lines.

Each plot was harvested when 80% of the plants in the plot had lodged. The harvest date was considered the maturity date, and the days from sowing until harvest were counted for each plot. The root systems of 20 bulbs from each plot were rated for the severity of pink root symptoms on a scale of 1 (no infected roots) to 9 (completely infected roots). After rating, bulbs were placed in mesh sacks and, on the same day, transferred indoors to an onion shed. Bulbs were cured for 3 to 4 d under ambient conditions to

![Fig. 2. Pedigree of ‘NuMex Whisper’ from 1992 to 2010.](image)
reduce storage losses and decay. After curing, the total bulb fresh weight was measured for each plot. Bulbs were graded to remove culls (diseased bulbs, bulbs under 3.8 cm in diameter, split and double bulbs). The number of culls was subtracted from the total bulb number to obtain the marketable bulb number per plot. After bulbs were graded, they were weighed again to obtain marketable bulb weight per plot. The average bulb weight was calculated by dividing marketable bulb weight by the number of marketable bulbs.

Table 1. Bulb maturity, scape production, pink root severity rating, marketable yield, average bulb weight, and percentage of single centers of ‘NuMex Whisper’ as compared with ‘NuMex Luna’ when grown on soil moderately infested with pink root pathogen at the Fabian Garcia Research Center, Las Cruces, NM, from 2007 to 2012.

| Cultivar        | Maturity date (DAS)a | Scapes (%)b | Pink root severity ratingc | Marketable yield (t·ha⁻¹)d | Avg bulb wt (g)e | Single centers (%)f |
|-----------------|----------------------|-------------|---------------------------|-----------------------------|-----------------|---------------------|
| **Trial 1 (14 Sept. 2007 seeding date)** |
| NuMex Whisper   | 20 June (280)        | 5.6         | 2.6                       | 65.4                        | 264             | 91.0                |
| NuMex Luna      | 14 June (274)        | 16.9        | 3.0                       | 63.1                        | 301             | 87.0                |

| **Trial 2 (21 Sept. 2007 seeding date)** |
| NuMex Whisper   | 12 June (265)        | 0.5         | 3.9                       | 51.9                        | 250             | 89.0                |
| NuMex Luna      | 6 June (259)         | 0.0         | 4.8                       | 60.9                        | 245             | 87.0                |
| ***             | NS                   |             | +                         | *                           |                 | NS                  |

| **Trial 3 (30 Sept. 2008 seeding date)** |
| NuMex Whisper   | 10 June (254)        | 0.0         | 2.0                       | 66.6                        | 349             | 96.0                |
| NuMex Luna      | 7 June (251)         | 3.1         | 2.9                       | 82.9                        | 329             | 90.0                |
| +               | +                    |             | +                         | *                           | NS              | **                  |

| **Trial 4 (25 Sept. 2009 seeding date)** |
| NuMex Whisper   | 13 June (262)        | 0.0         | 2.1                       | 46.5                        | 244             | 97.0                |
| NuMex Luna      | 10 June (259)        | 7.4         | 3.1                       | 48.3                        | 244             | 92.0                |
| NS              | *                    |             | +                         | NS                          | NS              | NS                  |

| **Trial 5 (22 Sept. 2010 seeding date)** |
| NuMex Whisper   | 1 July (279)         | 0.0         | 2.1                       | 20.1                        | 233             | 85.1                |
| NuMex Luna      | 27 June (275)        | 0.0         | 3.1                       | 27.5                        | 236             | 87.0                |
| +               | NS                   |             | *                         | NS                          | NS              | NS                  |

| **Trial 6 (29 Sept. 2011 seeding date)** |
| NuMex Whisper   | 6 June (248)         | 0.9         | 2.4                       | 23.1                        | 146             | 95.0                |
| NuMex Luna      | 4 June (246)         | 0.0         | 2.5                       | 30.8                        | 169             | 89.0                |
| +               | NS                   |             | NS                        | NS                          | NS              | NS                  |

| **Trial 7 (12 Oct. 2012 seeding date)** |
| NuMex Whisper   | 14 June (245)        | 0.0         | 2.1                       | 24.5                        | 179             | 93.0                |
| NuMex Luna      | 14 June (245)        | 0.0         | 2.4                       | 20.5                        | 190             | 91.0                |

\(^a^A\) plot was considered mature when 80% of the tops were down and was harvested at that time. DAS = days after sowing.

\(^b^The\) percentage of premature flower scapes was determined at harvest and calculated by dividing the number of plants with scapes by the total number of plants per plot and multiply by 100.

\(^c^Root\) systems of 20 bulbs per plot were rated based on a scale of 1 (no infected roots) to 9 (completely infected roots).

\(^d^Marketable\) bulb yield (t·ha⁻¹) was calculated by weighing the marketable bulbs per plot and adjusting the plot size to 1 ha.

\(^e^Average\) bulb weight was calculated by dividing the marketable bulb weight by the number of marketable bulbs.

\(^f^The\) 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 1.3 cm beyond the bulb’s center.

Conventional vegetable cultural practices were used for Trials 2, 3, 4, 5, 6, and 7, whereas organic practices were used for Trial 1. NuMex Whisper was tested as NMSU 08-06 for Trials 1, 2, 3, and 4 and as NMSU 10-06 for Trials 5, 6, and 7.

**Description and Performance**

‘NuMex Whisper’ is a late-maturing, intermediate-day, open-pollinated, yellow,
globe onion (Fig. 3) that matures from 6 June to 1 July when fall-sown in Las Cruces, NM (Table 1). Suggested planting dates at Las Cruces are 20 Sept. to 1 Oct. In five of the seven environments tested, bulbs of ‘NuMex Whisper’ matured later by 2 to 6 d than bulbs of ‘NuMex Luna’ (Table 1). Late-maturing, fall-sown onion cultivars are desirable in New Mexico because they often mature at a similar time as transplanted onions; however, direct sown onions result in greater returns than transplanted onions (Hadley et al., 2010). For two of three environments in which premature seedstalk formation or bolting was observed, ‘NuMex Whisper’ produced a lower percentage of plants with scapes than ‘NuMex Luna’ (Table 1). A sowing date after 20 Sept. is recommended for southern New Mexico because earlier dates can result in a greater bolting percentage as observed for Trial 1. Plants that produce seedstalks are unmarketable and thus reduce marketable bulb yield. For five of the seven environments, bulbs of ‘NuMex Whisper’ exhibited less severe pink root symptoms than bulbs of ‘NuMex Luna’ when plants of both cultivars were grown in soil deemed to be moderately infested with the pink root pathogen based on observations from previous growing seasons. Root systems that are severely damaged from pink root, exhibiting disease ratings of 6 or greater, result in lower average bulb weight and lower marketable bulb yield. In five of the seven environments, ‘NuMex Whisper’ produced a comparable marketable bulb yield as ‘NuMex Luna’ with any difference in bulb yield attributable to plant stand differences because average bulb weight was similar for both cultivars in most environments (Table 1). Plant stand was different between both cultivars in the 2007–08 test year with ‘NuMex Whisper’ and ‘NuMex Luna’ averaging 57 and 72 plants/plot, respectively (data not shown). For the 2008–09 test year, ‘NuMex Whisper’ and ‘NuMex Luna’ averaged 49 and 65 plants/plot, respectively (data not shown). Although not statistically different, these stand numbers could have caused a difference in marketable bulbs yield between the two cultivars although there was no difference in average bulb weight. ‘NuMex Whisper’ produced a comparable

Fig. 3. Harvested bulbs of ‘NuMex Whisper’ onion.

Table 2. Scale color, adherence, thickness, number, and quality ratings and bulb firmness rating of ‘NuMex Whisper’ as compared with ‘NuMex Luna’ when grown at the Fabian Garcia Research Center, Las Cruces, NM, from 2008 to 2012.

| Cultivar       | Scale color | Scale adherence | Scale thickness | Scale number | Scale quality | Bulb firmness |
|---------------|-------------|-----------------|----------------|--------------|---------------|---------------|
| **Trial 1 (30 Sept. 2008 seeding date)** |              |                 |                |              |               |               |
| NuMex Whisper | 3.3         | 1.1             | 2.0            | 2.4          | 3.5           | 7.6           |
| NuMex Luna    | 2.5         | 1.2             | 2.0            | 2.0          | 2.6           | 6.9           |
| **          | ++          |                 |               | NS           | **           | *             |
| **Trial 2 (25 Sept. 2009 seeding date)** |              |                 |                |              |               |               |
| NuMex Whisper | 1.9         | 1.2             | 2.4            | 2.7          | 2.2           | 7.5           |
| NuMex Luna    | 2.2         | 1.5             | 2.4            | 2.3          | 2.1           | 7.4           |
| NS           | +           |                 |               | NS           | NS           | NS           |
| **Trial 3 (22 Sept. 2010 seeding date)** |              |                 |                |              |               |               |
| NuMex Whisper | 2.2         | 1.5             | 2.5            | 1.9          | 2.3           | 7.4           |
| NuMex Luna    | 1.6         | 1.5             | 2.2            | 1.5          | 2.0           | 6.9           |
| **          | NS          |                 |               | **           | *             | *             |
| **Trial 4 (29 Sept. 2011 seeding date)** |              |                 |                |              |               |               |
| NuMex Whisper | 2.6         | 1.9             | 2.2            | 1.9          | 2.5           | 7.7           |
| NuMex Luna    | 2.2         | 1.7             | 2.0            | 1.6          | 2.1           | 7.1           |
| NS           | NS          |                 |               | +            | +             | **           |
| **Trial 5 (12 Oct. 2012 seeding date)** |              |                 |                |              |               |               |
| NuMex Whisper | 2.9         | 2.2             | 2.7            | 2.2          | 2.7           | 7.9           |
| NuMex Luna    | 2.0         | 1.6             | 2.4            | 1.6          | 1.9           | 7.0           |
| **          | **          |                 |               | **           | **           | **           |

*Dry outer scale color of 20 bulbs per plot was rated on a scale of 1 (very light yellow) to 9 (dark brown) after bulbs were graded.

**Dry outer scale adherence of 20 bulbs per plot was rated on a scale of 1 (scales easily removed when force is applied) to 5 (scales remained attached to bulb when force is applied) after bulbs were graded.

**Dry outer scale thickness of 20 bulbs per plot was rated on a scale of 1 (very thin) to 5 (very thick) after bulbs were graded.

**Number of dry outer scales that remain on the bulb after grading of 20 bulbs per plot.

**Dry outer scale quality of 20 bulbs per plot was rated on a scale of 1 (poor) to 9 (very excellent) after bulbs were graded. Poor scale quality characteristics included very light dry outer scale color, few scale layers, easily removed dry outer scale such that no scale remained on the bulb, fleshy scale greening, dry outer scale discoloration or staining, and/or nonuniform dry outer scale color. Excellent scale characteristics included tendency to have darker dry outer scale color, multiple dry outer scale layers, excellent scale adherence such that multiple scale layers remain on the bulb after grading, uniform dry outer scale color, absence of dry outer scale discoloration or staining, and/or absence of fleshy scale greening.

**Bulbs were rated on a scale of 1 (soft) to 9 (hard) when they were squeezed by hand at two separate points at the vertical center.

**NuMex Whisper was tested as NMSU 08-06 for Trials 1 and 2 and as NMSU 10-06 for Trials 3, 4, and 5.

**Nonsignificant at P = 0.10, significant at P = 0.01, and highly significant at P = 0.001, respectively. Test was conducted at α = 0.05.
Table 3. Bulb height, diameter, and shape index of ‘NuMex Whisper’ as compared with ‘NuMex Luna’ when grown at the Fabian Garcia Research Center, Las Cruces, NM, in 2008, 2010, and 2012.

| Cultivar       | Bulb ht (cm) | Bulb diam (cm) | Bulb shape index |
|----------------|--------------|----------------|-----------------|
|                | Trial 1 (30 Sept. 2008 seeding date) |                |                |
| NuMex Whisper  | 9.6          | 9.5            | 1.02            |
| NuMex Luna     | 9.2          | 9.8            | 0.95            |
|                | NS           | NS             | NS              |
|                | Trial 2 (22 Sept. 2010 seeding date) |                |                |
| NuMex Whisper  | 7.8          | 7.8            | 1.01            |
| NuMex Luna     | 8.2          | 7.8            | 1.05            |
|                | NS           | NS             | NS              |
|                | Trial 3 (12 Oct. 2012 seeding date) |                |                |
| NuMex Whisper  | 8.6          | 9.0            | 0.96            |
| NuMex Luna     | 8.2          | 9.4            | 0.88            |
|                | NS           | **             | NS              |

*Bulb height is the distance from the bottom of the bulb to the top of the bulb.

*Bulb diameter is the widest distance from one side of the bulb to the other.

*Bulb shape index is calculated as bulb height divided by bulb diameter.

*For trial 1, ‘NuMex Whisper’ was tested as NMSU 08-06 for Trials 2 and 3; ‘NuMex Whisper’ was tested as NMSU 10-06.

ns, *Nonsignificant at P = 0.10, significant at P = 0.01, respectively. Test was conducted at α = 0.05.

percentage of bulbs with a single growing point (single center) as ‘NuMex Luna’ (Table 1). Onion ring processors request cultivars that produce a high percentage of single-centered bulbs, usually greater than 85%, when purchasing onion bulb shipments for processing. In each environment, ‘NuMex Whisper’ was at or above that target percentage.

Because scale characteristics and bulb firmness were important characters evaluated during the selection process, the dry outer scale color, adherence, thickness, number, and quality, and bulb firmness of ‘NuMex Whisper’ were compared with the same characters for ‘NuMex Luna’ for 5 years (Table 2). For three of the five environments, bulbs of ‘NuMex Whisper’ were rated as having a darker outer dry scale color than bulbs of ‘NuMex Luna’ (Table 2). A darker yellow color may be more desirable for certain commercial onion buyers. Bulbs of ‘NuMex Whisper’ possessed a greater number of dry outer scale layers than bulbs of ‘NuMex Luna’ in four environments (Table 2). A higher number of dry scale layers helps to protect the fleshy scale layers underneath from damage that may occur during harvest and grading. Because of these scale characteristics, bulbs of ‘NuMex Whisper’ were rated as possessing better scale quality than ‘NuMex Luna’ in four environments (Table 2). When bulbs were hand-squeezed, bulbs of ‘NuMex Whisper’ were rated as being firmer than bulbs of ‘NuMex Luna’ in four environments (Table 2). Like with the number of dry outer scale layers, firmer bulbs are less likely to develop damage during harvesting and grading. In terms of bulb shape, bulbs of ‘NuMex Whisper’ were similar in height, diameter, and shape index as bulbs of ‘NuMex Luna’ (Table 3). Bulbs that possess a shape index close to 1 tend to be more rounded in shape and are more desired commercially.

The objectives of the New Mexico State University onion breeding program are to develop high-yielding, high-quality, well-adapted, bolting-resistant, disease-resistant, short-, intermediate-, and long-day onion cultivars with varying maturities and scale colors for production in southern New Mexico. ‘NuMex Whisper’ exhibits many of these desired characteristics—high yield potential, late maturity from fall sowing, a high level of bolting and pink root resistance, and several desirable measures of bulb quality: a high percentage of single-centered bulbs, a high level of bulb firmness, a bulb shape index close to 1, and a desirable dry outer scale quality in the form of multiple layers of dark yellow scales. The performance of ‘NuMex Whisper’ in terms of these characters meets or exceeds the performance of commercial cultivars such as ‘NuMex Luna’ that are grown in southern New Mexico and mature at a similar time.

**Availability**

Seed of ‘NuMex Whisper’ is available and interested parties should contact C.S. Cramer, Dept. of Plant and Environmental Sciences, MSC 3Q, Box 30003, New Mexico State Univ., Las Cruces, NM 88003. An application for plant variety protection will be filed.

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