‘Raider Gold’ Plains Zinnia (*Zinnia grandiflora* Nutt.)

Cynthia B. McKenney^{1,5}, Amber Bates², and Kaylee Decker³

Department of Plant and Soil Science, Texas Tech University, M.S. 2122, Lubbock, TX 79409

Ursula K. Schuch⁴

School of Plant Sciences, University of Arizona, Tucson, AZ 85721

Additional index words. Asteraceae, *Crassina grandiflora*, heat-tolerant, native plant, Prairie Zinnia, Rocky Mountain Zinnia, wildflower

Native wildflowers provide an excellent resource for low-maintenance ornamental plants tolerant of both heat and drought. With increasing concerns regarding water quality and quantity, the use and demand for tough ornamentals is on the rise. To address this need, native accessions of *Zinnia grandiflora* Nutt. were collected over the past nine years and incorporated into an ornamental breeding program aimed at enhancing the appearance and performance of these plants in landscapes. In addition, efforts have been focused to identify minimal inputs needed to maintain this native plant in an urban landscape. ‘Raider Gold’ is a new plains zinnia cultivar release from Texas Tech University. ‘Raider Gold’ is intended for use in demanding landscape situations where heat and drought reduce the performance of more traditional ornamentals. In university trials, this perennial displayed attractive golden flowers on a compact plant with a mounding habit. ‘Raider Gold’ exhibits an extended bloom period even during the toughest growing seasons. This feature suggests ‘Raider Gold’ is an excellent selection for full sun landscapes.

Background

Plains zinnia (*Zinnia grandiflora* Nutt.) is a low-mounding perennial wildflower with attractive golden flowers and an extended length of color show (Arnold, 2002; Liberty Hyde Bailey Hortorium, 1976). This striking wildflower has a colorful ethnobotanical history related to its use by various Native American tribes. It is reported the Acoma and Laguna Indians drank an infusion of the plant for kidney ailments and also added it to their bath to prevent excessive sweating (Swank, 1932). Swank also relates Acoma and Laguna

Indians made red body paint from a ground flower paste. Plains zinnia flowers were also rubbed on buckskins to dye them yellow. When added to white clay or warm water, the yellow mixture was used to dye wool. It is also reported Navajo Indians used a decoction of plains zinnia for throat troubles (Elmore, 1944).

Much was made of the appearance and dissemination of plains zinnia by early explorers and botanizers. Plains zinnia was first mentioned in print by Dr. James in Long’s first military expedition (Torrey and Gray, 1840). Major Emory, on one of his military expeditions, was one of the first to describe the plant in detail: “In the later part of July last, while botanizing in the vicinity of Pueblo, Colorado, I found this species of *Zinnia* in great abundance, and was especially struck with its singular and, to me, novel method for the dispersion of its seeds.... Further observation revealed the fact that the rays are persistent even until after the achenes are fully ripened” (Day, 1848).

Plains zinnia is a subshrub with a mounding growth habit 15 to 25 cm tall with 2-mm wide strigose to scabrous pale green foliage. The yellow daisy-like flowers are present from April through November and fade to buff in the winter retaining some ornamental appearance (Correll and Johnston, 1970; McDougall, 1973; Shreve and Wiggins, 1964). It is cold-hardy from USDA zones 4 to 8 and is tolerant of drought and calcareous soils making it an excellent addition to dry gardens in higher elevations (Arnold, 2002). Plains zinnia is native to a wide range in the southern United States including the plains states from Kansas to Nevada, south to Texas, New Mexico, Arizona, and in Mexico near Sonora, Durango, and Zacatecas (Correll and Johnston, 1970; McDougall, 1973; Shreve and Wiggins, 1964). It is a member of the sunflower family (Asteraceae) and spreads by rhizomes to create a mat (Arnold, 2002). Plains zinnia goes dormant at higher elevations but is almost evergreen in our zone 6 plots.

Origin

Accessions of plains zinnia were identified and collected during the springs of 2002 and 2003 from the Edwards Plateau, Rolling

High Plains and High Plains vegetational regions of Texas (Correll and Johnston, 1970). Seeds of each accession were cleaned and stored in a refrigerator in a sealed container. In 2003, each accession of plains zinnia seeds was germinated in Metro-mix 200™ (Sun Gro Horticulture Canada, Ltd.) peat-lite media in 10 cm × 15-cm disposable aluminum pans. Seeds were germinated in a greenhouse with temperatures ranging from 20 to 27 °C daily. After seedlings achieved the four-leaf stage, they were transplanted into 52-count plug trays and grown 4 additional weeks in the greenhouse. Plug trays of plants were acclimatized for 3 weeks in a shade area and then transplanted into the field at the Texas A&M Agrilife Center farm in Dallas, TX, where the soil is characterized as Austin silty clay (fine-silty, carbonatic, thermic Udorthentic Haplustolls). This soil provided less drainage and also had a greater shrink swell potential than the rocky slopes where the seeds were harvested. The transplants were irrigated as needed during the growing season; however, no fertility was added. Plains zinnia accessions adapted well to this different soil condition and the top two accessions were selected for superior color, number of flowers, and uniform compact habit. Seeds of superior selections were cleaned and stored in a sealed container within a refrigerator for future work.

During 2004, the two superior accessions were grown following the previously described protocol and were allowed to open-pollinate for the second growing season (there were no other native populations present to serve as alternate pollen sources). At the end of the growing season, seeds were once again collected, cleaned, and stored under refrigeration. In 2005, seeds collected from the previous year were planted and evaluated for compact nature and number of flowers and the accession TTU-CC-1 was advanced as the superior accession for overall performance.

During the 2006 growing season, the field studies were moved to the Texas Tech University experimental farm where plugs were planted with a mechanical transplanter to simulate commercial production. The soil at the Lubbock, TX, farm is an Amarillo fine sandy loam (fine-loamy, mixed, superactive, thermic Aridic Paleustalfs) with a pH of 8.2. At peak bloom, ≈50% of the plants were rouged from TTU-CC-1 as a result of an open-centered and less compact growth habit (Cycle 1). Recurrent phenotypic selection was used to screen the material again in 2007 (Cycle 2) and 2008 (Cycle 3) with only minimal rouging needed. In 2009 (Cycle 4) seeds displayed good uniformity and field performance and were bulked for further increase in 2010. Seeds from ≈500 plants grown in 2010 (Cycle 5) material were again bulked and increased in the field during 2011. In 2011 (Cycle 6), uniformity and field performance remained stable and this material is now being released as *Zinnia grandiflora* ‘Raider Gold’, the fourth addition to the Raider Wildflower Collection™.

Received for publication 10 July 2012. Accepted for publication 22 Sept. 2012.

Texas Tech University manuscript no. T-4-620.

¹Professor.

²Former Instructor.

³Former Graduate Student.

⁴Professor and Extension Specialist.

⁵To whom reprint requests should be addressed; e-mail ukschuch@ag.arizona.edu.

Description

‘Raider Gold’ plains zinnia has a mature plant height of 12.6 cm with a spread of 41.1 cm. This mounding perennial produces composite heads composed of three to five florets. All color documentation for this release was evaluated using the RHS Color Chart (Royal Horticulture Society, 2001). The disk florets were golden (yellow group 12A) with surrounding darker ray flowers (orange group N25D) and a light green foliage (green group 137D). ‘Raider Gold’ blooms from late spring to first frost. When flowers senesce, the buff-colored structures remain attached until removed. ‘Raider Gold’ foliage consists of 2.1-mm wide strigose to scabrous pale green leaves (yellow-green group 91B) and has a length of 15.9 mm. The seed is dark brown (brown group 200A) with an average 1000 seed weight of 1.94 g.

Performance

During the 2009 through 2010 growing seasons in Lubbock, TX, plants randomly selected from Cycles 3 and 4 populations were compared with an available common seed source of plains zinnia (control plants) using a randomized complete block design. Each of the four blocks contained 15 plants transplanted into unamended field soil. Irrigation was provided as necessary during the growing season. Morphological characteristics were compared with analysis of variance using IBM SPSS Statistics 20.0 (IBM SPSS, 2011). ‘Raider Gold’ developed a greater number of stems per plant as well as greater floret length and width when compared with the control plants (Table 1). This increase in floret size created a more dense floral appearance in ‘Raider Gold’ (Fig. 1).

Propagation Requirements

‘Raider Gold’ is recommended for use in native landscapes and low-maintenance areas in foreground plantings. Plants may be propagated by seed. ‘Raider Gold’ has greatest germination percentage after stratifying seed for 6 weeks in a 6 °C cooler and then maintaining the germination media at that same temperature in the dark. ‘Raider Gold’ zinnia grows best in full sun and a well-drained soil. During the 10 years of managing

Table 1. Comparison of a common accession of *Zinnia grandiflora* and *Zinnia grandiflora* ‘Raider Gold’ in field trials in Lubbock, TX.

2009			
Germplasm source	Stems per plant (no.)	Floret length (mm)	Floret width (mm)
Common	5.33 (0.741) ^z	10.3 (0.314)	10.44 (0.440)
Raider Gold	9.47 (1.573)	12.5 (0.215)	12.40 (0.286)
Significance	*	***	***
2010			
Germplasm source	Stems per plant (no.)	Petal length (mm)	Petal width (mm)
Common	11.65 (0.563) ^z	15.38 (0.450)	8.72 (0.388)
Raider Gold	15.40 (1.35)	18.72 (0.284)	10.47 (0.448)
Significance	*	***	***

^zMeans represent separate measurements of 15 plants of each germplasm source. Numbers within parentheses are the SEM.

*, *** *t* test significant at $P \leq 0.05$ and $P \leq 0.001$, respectively.

Fig. 1. Example of field grown TTU-CC-1 (‘Raider Gold’) plains zinnia plant on the left and a common plains zinnia plant TTU-T9 on the right.

this crop, we did not experience any insect damage.

Availability

For availability of both experimental and commercial seed, contact the corresponding author, Texas Tech University, Dept. of Plant and Soil Science, Lubbock, TX 79409-2122; phone (806) 742-2838.

Literature Cited

- Arnold, M.A. 2002. Landscape plants for Texas and environs. Stipes Publishing L.L.C., Champaign, IL. p. 333-337.
Correll, D.S. and M.C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner, TX.
Day, D.F. 1848. Notes of a military reconnaissance. Report of Major Emory. Buffalo, NY.
Elmore, F.H. 1944. Ethnobotany of the Navajo. School of American Research, Santa Fe, NM.

- IBM SPSS. 2011. IBM SPSS statistics standard edition 20.0. International Business Machines Corp., Armonk, NY.
Sun Gro Horticulture Canada, Ltd. Sun Gro Metro-Mix 200 professional media. Sun Gro Horticulture Canada, Ltd., Bellevue, WA.
Liberty Hyde Bailey Hortorium. 1976. Hortus third: A concise dictionary of plants cultivated in the United States and Canada. Macmillan Publishing Co., New York, NY.
McDougall, W.B. 1973. Seed plants of northern Arizona. Amer. J. Bot. 14:258-267.
Royal Horticulture Society. 2001. RHS colour chart. Royal Horticulture Society, London, UK.
Shreve, F. and I.L. Wiggins. 1964. Vegetation and flora of the Sonoran desert. Stanford Univ. Press, Palo Alto, CA. 1:70, 1526.
Swank, G.R. 1932. The ethnobotany of the Acoma and Laguna Indians. MA thesis, Univ. of New Mexico, NM. p. 38.
Torrey, J. and A. Gray. 1840. Flora of North America. Transactions of the American philosophical society. New Series 7:348.