Cultural and Establishment Trial of Colorado Butterfly Plant

In 1996, the USDA Natural Resources Conservation Service's Plant Materials Center (BPMC) in Bridger, Montana, began working with the Wyoming Interagency Gaura Working Group on the potential seed increase of *Gaura neomexicana* ssp. *coloradensis*, a candidate species proposed for listing as threatened under the Endangered Species Act. Seed was collected that year at two sites on the F.E. Warren Air Force Base near Cheyenne, Wyoming. One site was a population of "challenged" plants that were small-statured or browsed, and the other site was a "normal" population of plants assessed as healthy and mature. The seed was sent to the BPMC for propagation, determination of cultural requirements, evaluation of plant performance, and seed increase. In May 1997, two plots were established, each in 3 rows, 3 feet (0.91 meters) apart, with 100 seeds planted every 6 inches (15.2 centimeters) at an approximate depth of 1 inch (2.5 centimeters). The rows were oriented to the prevailing north to south wind and separated east to west by 50 feet (15.2 meters) to minimize outcrossing. Supplemental sprinkler irrigation was applied to keep the plots moist and weeds were removed as necessary. Seedlings began to emerge two months after planting, with seed germination in the challenged plot at 3 percent, while germination was more than doubled at 7 percent in the normal plot. Rosette widths were 4 to 6 inches (10 to 15 centimeters) in the first growing season and winter survival was 100 percent in both plots. In 1998, flowering heights were 2 to 3 feet (0.61 to 0.91 meter), and initiation of the four-petaled, whitish-pink flowers occurred from early July until the onset of freezing temperatures in October. Seed harvest was initiated on August 10 and seed readiness was monitored on a daily basis due to the extreme degree of indeterminate phenology in this monocarpic, short-lived member of the Evening Primrose Family. The plants in the normal plot produced 3 ounces (85 grams) of seed, while the challenged plot produced no viable seed. There are approximately 59,000 very hard, four-angled, dark brown to black, nut-like seeds per pound (130,000 seeds per kilogram). The US Fish and Wildlife Service listed this rare plant as threatened under the Endangered Species Act in October 2000, at which time they determined that until a final designation was made on critical habitat, continued existence of the BPMC planting and seed storage was legal. The challenged plot was removed in 1999, and the normal plot continued its reproductive mode until removal in 2001. After 7 years in storage, a tetrazolium test indicated that 87 percent of the seeds remain viable.