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Trends in the

WESTERN NATIVE PLANT SEED INDUSTRY

since 1990



ABSTRACT

In the 1990s western native seed markets expanded beyond traditional mineland reclamation and wildlife habitat customers to fire rehabilitation and nonprofit organization conservation efforts. The USDA Conservation Reserve Program's emphasis on native plants for agricultural set-aside acreage was also a major contributor to industry growth during this period. In contrast to 13 y ago, government-based demand now dominates the market. Unpredictable government demand resulting from CRP and wildland fires has caused sharp price escalations when demand has exceeded supply. Conversely, overplanting and subsequent multi-year harvests of these perennial crops have resulted in price drops as seed stocks accumulated in the face of weakened demand. But overall, prices quadrupled between 1990 and 2000 before falling back in the 2000 to 2002 period. Furthermore, from 1996 to 2000 native grass seed acreage increased 118% to nearly 6070 ha (15 000 ac). Today, seed crops are much more likely to be produced by growers under contract to seed companies, rather than speculatively by producers/marketers as was typical in 1990.

KEY WORDS

production, Conservation Reserve Program, prices, fire rehabilitation, seed, Bureau of Land Management

NOMENCLATURE

USDA NRCS (1999)

Seed production areas at the USDA Forest Service Lucky Peak nursery near Boise, Idaho.

Photo by Kas Dumroese

As producers of native seeds, we have observed several trends in our industry during the last 13 y. The fluctuation in supply and demand, changes in the business structure of our industry, influence of the federal government as a buyer, and changes in species availability have had significant influence on the way we conduct business.

TRENDS IN DEMAND

Mineland reclamation and wildlife habitat projects were the key elements of native seed demand in the western US from 1990 to 1996. Mineland reclamation was stimulated by the Surface Mine Reclamation Act of 1982, a statute directed specifically at the coal industry that was still expanding rapidly in the early 1990s. Throughout the mid-1990s, regulatory agencies began to require more natives for any private disturbance on public land. Since then, the use of introduced species in mineland reclamation has declined, but it persists, often because of shortages or high prices of native seeds. By the late 1990s, however, with closure of coal mines in Colorado and gold mines in Nevada, demand for mineland reclamation began tapering off.

Relative to the market as a whole, private environmental nonprofit organizations were large purchasers of seeds from 1992 to 1998, but their demand fell significantly in the latter part of the 1990s. In comparison, demand for seeds for fire reclamation grew rapidly in the latter half of the 1990s, concomitant with the increasing popularity of native species. At first, we as an industry viewed this large fire-caused demand as an anomaly, but several successive years of massive wildfires have made fire rehabilitation a central theme. Simultaneously, the completely unanticipated second round of the Conservation Reserve Program (CRP) kicked off in 1997, catching our industry unprepared to handle the large demand from landowners in every western state. One consequence of the CRP, and to a lesser

extent fire demand, was the general quadrupling of prices between 1997 and 1999.

TRENDS IN PRICES

By 1989, seed demand generated by the first round of CRP had peaked, market supply met demand, drought delayed further CRP planting, and seed prices dropped suddenly. As the last stages of this CRP round were being planted, prices began falling as surplus seeds began to accumulate in marketer and producer warehouses. A number of producers and marketers went out of business during the late 1980s and early 1990s. In 1992, as prices continued to tumble to levels at or below production costs, fields went out of production. Prices began to rise modestly in 1993 and 1994 as marketers began to realize that CRP carry-over inventories were nearly exhausted and production acreage was below existing demand. New acres were planted sporadically and cautiously and prices were firm during the 1994 to 1996 period. Markets cleared inventories and margins moved to modest but sufficient levels.

During 1997 prices doubled with increased demand due to fires and the second round of CRP. Prices continued to rise into the fall of 1998 as CRP demand rose, and by 1999, with CRP at its height, large demand for Nevada fire rehabilitation drove prices up even further, more or less cleaning off the shelves. In 2000, with CRP demand still high, an even larger demand for fire rehabilitation was generated, this time primarily for Montana and Idaho fires. Seeds were pulled out of cleaning mills before they could even reach warehouse shelves. Prices increased in fall 2000 when it was realized that an entire year's supply of seeds were in demand even before they could be conditioned. Delivery schedules slipped, creating temporary shortages. Some prices rose due to the perception that the USDI Bureau of Land Management (BLM) would buy at any price.

In Figure 1 we include a 13-y price history of 4 key native grass species (Poaceae) that illustrate this trend in price. Note the drop in prices from 1990 to 1992, equilibrium from 1994 to 1996, and increases from 1996 to 1998. Also, note the rapid drop in prices from 1998 to 2000 when seed stocks of 'Pryor' slender wheatgrass (*Elymus trachycaulus* [Link] Gould ex Shinners) and 'Rosana' western wheatgrass (*Pascopyrum smithii* [Rydb.] A. Löve) temporarily exceeded demand, setting the stage for fields to be plowed. In 2002, prices of 'Secar' Snake River wheatgrass (*Elymus wawawaiensis* J. Carlson & Barkworth), 'Critana' thick-spike wheatgrass (*E. lanceolatus* [Scribn. & J.G. Smith] Gould), and 'Rosana' western wheatgrass fell and approached the cost of production. In contrast, high current prices for 'Pryor' slender wheatgrass reflect high fire-related demand coupled with reduced production resulting from an oversupply in 2000.

REASONS FOR THE IMBALANCE BETWEEN SUPPLY AND DEMAND

From 1989 to 1992 CRP demand evaporated, leaving large unsold inventories and continued high production, resulting in falling prices. Why did production remain high for so long? 'Sodar' streambank wheatgrass (*Elymus lanceolatus* [Scribn. & J.G. Smith] Gould) produced in 1989 didn't clear the market until 1994. Then prices rose between 1994 and 1996 even though no significant new demand arose. Why? This anomaly is explained by the producer-product cycle that extends from the time of creation of new demand to cessation of corresponding new production. Usually, this cycle starts with a period of low prices and low supplies. Then, new demand raises prices. Supplies increase to catch up with demand and eventually exceed demand. Finally, prices drop and supplies contract.

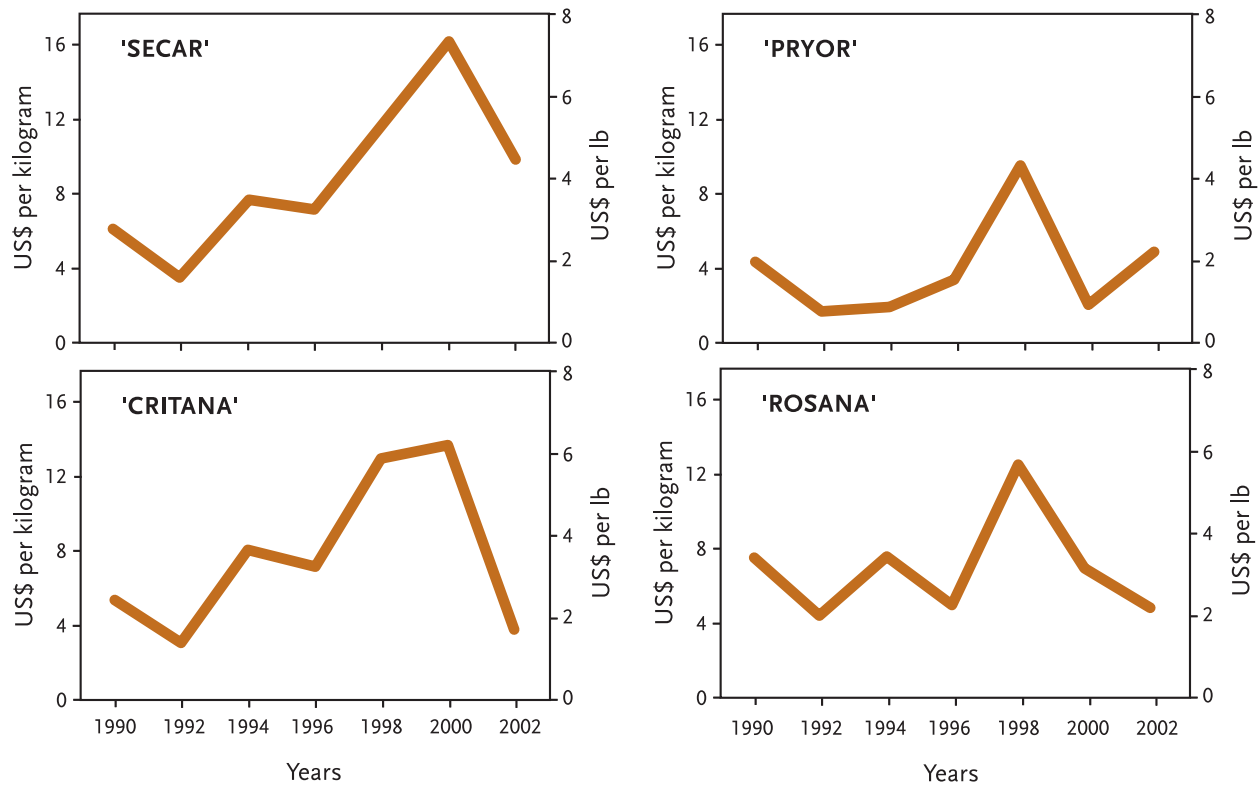


Figure 1. Prices of 'Secar' Snake River wheatgrass (*Elymus wawawaiensis*), 'Critana' thickspike wheatgrass (*E. lanceolatus*), 'Pryor' slender wheatgrass (*E. trachycaulus*), and 'Rosana' western wheatgrass (*Pascopyrum smithii*) from 1990 through 2002.

Within the seed industry immutable lags occur between demand and supply. Western native grasses usually don't produce their full seed potential until the second or third year of production. In colder climates they almost never produce seeds the first year. Depending on species, 3 to 6 y of production are all that can be expected before the field loses vigor. For many species, stand establishment failure is high, being dependent on fortuitous meteorological events. Usually a gap of 1 or 2 seasons occurs between recognition of new demand and planting the first seeds to meet that demand. Grass seed fields usually remain in production for the life of the stand rather than being removed because of reduced demand. The typical scenario is that the most substantial supply expansion will occur just before supply equals demand, when prices are highest. New production then comes on-line at or after the demand has peaked or has begun to drop.

In the Sodar example, expanded production continued to enter the market for 3 to 4 y after demand had evaporated. At the end of the production cycle, when farmers and marketers had to decide what to next plant into their fields, they saw the large accumulated supply and elected not to replant Sodar. For several years vendors lived off accumulated supplies, uncertain how much inventory was out there or how fast it was being liquidated. When the last carry-over seeds of Sodar were sold, the industry realized that current production was no longer sufficient to meet demand. At this point, prices started to rise and growers began planting Sodar again. Had the second round of CRP not come along, prices would probably have fallen again when the new expansion reached market. This is a description of a producer-product cycle for an easily cultivated grass. The research and expansion cycle for an experimental forb, however, may take a decade or longer.

No matter how good the grower, weather plays a pivotal role in determining the success of a seed crop. For many species, the number of flowering heads is determined the previous autumn, and the quality of seed fill is determined in spring. Excessive heat or wind during flowering, improper levels of moisture, insect or disease damage, and a host of other variables may reduce production. Thus, a field of western wheatgrass may produce 1120 PLS kg/ha (1000 lb/ac) one year and 112 PLS kg/ha (100 lb/ac) the next. This fluctuation is typical for many species. And western wheatgrass is an easily grown species! Seed production of forbs and shrubs is usually far more erratic. Consequently, any estimate of the size of production based upon acres planted is subject to large errors. The 1996 reported acreage of Sodar streambank wheatgrass shows that much of what was planted failed to produce seeds and was plowed out. It may also show that a disproportionate

Photo by Daniel C. Ogle



Figure 2. Using a side dresser to fertilize a grass seed field at the USDA Natural Resources Conservation Service Aberdeen Plant Materials Center in Idaho.

number of acres planted under dryland conditions failed to establish.

TRENDS IN INDUSTRY STRUCTURE

Since 1990, production and marketing of native seeds have changed dramatically. In 1990, as much as 80% of native seeds produced by growers was sold to marketers for resale to retailers. Today, as much as 70% of the production is contracted to specific marketers before the crop is even planted, with marketers setting terms on producers to varying degrees. Regional marketers have significantly reduced the number of localized retailers in the reclamation market, for example, fertilizer dealers, who have neither the expertise nor inventory to compete in today's market. Recently, large producers have shown signs of dissatisfaction because of perceived relationship asymmetry with marketers. We expect a trend of producers striking out on their own, especially if dropping seed prices cause marketers to

squeeze producer margins. Internet advertising of government seed purchases for separate items will encourage producers to market their own seeds.

A word about the role of marketers is in order at this point. In any market there is competition for power among producers, marketers, and consumers. Each entity competes to improve its position and to enforce its will upon the others. Power ebbs and flows due to changing circumstances. The role of the producer is to plant, grow, and harvest seeds. The marketer typically supplies seeds for planting and sends an in-house agronomist to instruct the producer when to spray, water, weed, rogue off-types, and harvest. The marketer then cleans and sells the seeds. Tension exists between all levels of production and consumption. If any level exerts undue power over another level, it is because a market distortion has shifted the balance of power. During the 1990s, rapid and unexpected changes in seed demand by federal agencies favored marketers over producers and consumers because marketers reacted

quickly to risk and opportunity. The collapse of wheat prices also favored marketers by creating a large pool of new producers. Market distortions tend to be temporary and have already begun to favor consumers as good-quality seeds have flooded the market. Marketers are important in creating production and distributing seeds. We contend that producers are rarely good marketers, marketers are rarely good producers, and consumers are rarely good at either marketing or production. Legitimate separation and balance of roles should be respected by the government as it administers programs creating demand for seeds.

RESPONSIBILITY OF THE FEDERAL GOVERNMENT AS A CONSUMER

Federal agencies have come to dominate the demand side of the market equation, but rarely do they assess the impact of their programs upon seed suppliers. We estimate that government purchases, either direct (for example, BLM and USDA Forest Service) or indirect (for example, federal programs such as the CRP), in the western native seed market have risen from about 30% market share in 1990 to 75% in 2000. Nongovernmental use of natives in private revegetation has increased overall but has decreased as a percentage of total demand. Government fire purchases have created boom–bust cycles during which private consumers of seeds have been squeezed out of the market by high prices or short supplies. Vendors have been forced to hoard seeds for regular customers by buying early in anticipation of government competition for short supplies. In general, this causes the market to buy in frenzy or to sell in panic if government demand fails to materialize. The clever and well-financed marketers quickly buy up uncommitted seeds from others not as well endowed. Speculation moves seed

supplies to those willing to take the risks from those less willing or able to do so. Supplies large enough to meet BLM demands are accumulated from various geographical regions and held by aggressive vendors.

Since 1999 many BLM districts have made their purchases in a single, very large centralized bid. This practice appears to have created price spikes in anticipation of federal purchases. Other factors contributing to the spikes have been low carry-over inventories, delays in conditioning new crop seeds, required delivery schedules, uncertainty about the adequacy of present supplies, and anxiety about the future. Ironically, the centralization of BLM purchasing has made the total demand more transparent, but because of its overwhelming size, this may not have produced a more efficient market. Retail value of thick-spike wheatgrass fell from US\$ 18.74 per PLS kg in the fall of 1999 to \$7.72 by spring of 2000 and rose to \$14.33 by that September (US\$ 8.50, \$3.50, and \$6.50 per PLS lb, respectively). The irony here is that the highest prices occurred in fall when supplies were most available, and the trough in prices occurred in spring when supply was most restricted, illustrating the importance of future demand expectations. Without some kind of demand stabilization by federal agencies, both private consumers and sellers will face high risk as the federal government becomes an increasingly prominent consumer of native seeds.

TRENDS IN SPECIES AVAILABILITY

A number of species moved out of the experimental category to become fairly reliable items during the 1990s. Warm-season grasses such as blue grama (*Bouteloua gracilis* [Willd. ex Kunth] Lag. ex Griffiths), sideoats grama (*Bouteloua curtipendula* [Michx.] Torr.), prairie sandreed (*Calamovilfa longifolia* [Hook.] Scribn.), little bluestem (*Schizachyrium*

scoparium [Michx.] Nash), and buffalo-grass (*Buchloe dactyloides* [Nutt.] Engelm.) remained widely available and improved greatly in quantity after the decline of the first CRP. Purities of warm-season grass seed lots rose from about 60% in 1990 to 80% to 90% by 2000. Cool-season grasses entering the reliable category included Indian ricegrass (*Achnatherum hymenoides* [Roemer & J.A. Schultes] Barkworth), Canada wildrye (*Elymus canadensis* L.), Sandberg bluegrass (*Poa secunda* J. Presl), and bottlebrush squirreltail (*Elymus elymoides* [Raf.] Swezey).

Unfortunately, new grass species development slowed during the decade, probably due to federal funding reductions. Established research branches of government have not redesigned their research focus quickly enough to correspond to the heightened interest in site-specific material. The industry has been unable to supply seeds of some high-demand species because improved plant material remains unavailable. For example, while wildland collections of needle-and-thread (*Hesperostipa comata* [Trin. & Rupr.] Barkworth) made this grass occasionally plentiful in the last decade, an aggressive and higher seed-yielding cultivar needs to be developed. Commercial attempts to cultivate needle-and-thread have failed because of poor establishment, seedling competitive ability, and seed yield. Prairie junegrass (*Koeleria macrantha* [Ledeb.] J.A. Schultes) is another major rangeland grass that needs research input. At present, much prairie junegrass being sold as native is the cultivar 'Barkol', of European origin.

Wildland-collected seeds of some species became available in quantities thought impossible in 1990. Chief among them were Wyoming big sagebrush (*Artemisia tridentata* Nutt. ssp. *wyomingensis* Beetle and Young [Asteraceae]), fourwing saltbush (*Atriplex canescens* [Pursh] Nutt. [Chenopodiaceae]), Gardner's saltbush (*Atriplex gardneri* [Moq.] D. Dietr.), and Rocky Mountain beeplant (*Cleome serrulata*

[Capparaceae]). Large rabbitbrush (*Chrysothamnus* Nutt. spp. [Asteraceae]) seed supplies remained problematic for reasons of low demand and poor seed quality. By the end of the decade, large roving bands of collectors had replaced small informal groups as the primary suppliers of wildland-collected seeds.

Some field-grown forbs became widely available during the 1990s, such as 'Bandera' Rocky Mountain penstemon (*Penstemon strictus* Benth. [Scrophulariaceae]), western yarrow (*Achillea millefolium* L. var. *occidentalis* DC. [Asteraceae]), and 'Appar' blue flax (*Linum perenne* L. [Linaceae]). (The latter cultivar, like Barkol prairie junegrass, is a foreign introduction.) But cultivar and germ plasm development of native forbs and shrubs proved largely unsuccessful during the 1990s. Many cultivars and germ plasms have struggled to secure a place in the market, including 'Wytana' and 'Rincon' fourwing saltbush, 'Timp' northern sweetvetch (*Hedysarum boreale* Nutt. [Fabaceae]), 'Summit' prairie sage (*Artemisia ludoviciana* Nutt.), 'Hobble Creek' mountain big sagebrush (*A. tridentata* Nutt. ssp. *vaseyana* Rydb.), 'Gordon Creek' Wyoming big sagebrush, firecracker penstemon (*Penstemon eatonii* Gray), sulfur buckwheat (*Eriogonum umbellatum* Torr. [Polygonaceae]), and Pacific aster (*Symphotrichum chilensis* [Nees] Nesom [Asteraceae]). Each failed for a different reason, but none have been consistently profitable given existing technology and demand.

FUTURE TRENDS IN THE SEED INDUSTRY

Every indication is that cheatgrass (*Bromus tectorum* L.)-engendered fires will continue to increase in size and frequency in the Great Basin (Nevada and portions of surrounding states). Species in demand will be determined by multiple criteria such as price and availability. But demand will be increasingly domi-

nated by political and philosophical considerations until research resolves such issues as the relative merits of local ecotypes versus improved cultivars, or the use of annual cover crops in perennial native-seed mixes.

Disastrous surpluses were averted in 2001 and 2002 by the high fire demand. Vendor concerns about future fire-rehabilitation demand include wild fluctuations in prices and the possibility of ruinous surpluses should fire demand fail to materialize. In response to CRP demand and then to successive years of high fire demand, native grass seed acreage increased from 2710 ha (6700 ac) in 1996 to 5910 ha (14 600 ac) in 2000. The nearly unanimous seed dealer perception is that too many acres have been planted to natives within the past few years. Additionally, 2 new seed cleaning plants and 2 remodelled plants

have come on-line, with another 2 new plants beginning construction in 2001. Although the primary motive in their construction was to reduce conditioning time and to reorganize production, these new plants also added additional acreage capacity. For the moment, producers and marketers are reluctant to maintain planted acreage given the perception of dangerously high production levels.

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