Capstone Address.

Crested Wheatgrass:

Its Values, Problems and Myths; Where Now?

Thadis W. Box

INTRODUCTION

After three days of many fine papers examining crested wheatgrass from every angle, it would seem there is little left to say on the subject. However, my task is to summarize the papers and speculate on what may be done with crested wheatgrass in the future. It is a task I approach with pleasure.

Crested wheatgrass is, according to this conference, a truly great grass. Its performance record is indeed impressive. First introduced some 85 years ago from Russia and planted in a few nurseries, it spent some thirty years in relative obscurity waiting for its big chance to help reestablish productivity of the deteriorated western ranges. Between 1930 and World War II it was seeded throughout the northern Great Plains, the prairie provinces of Canada, and the Intermountain region in the United States. Today it continues to be one of the major grasses used for the rehabilitation of deteriorated lands in the drier portions of western North America.

Biologically, crested wheatgrass is an aristocrat. It is the type species of its genus and retains the name Agropyron while its cousins in the Triticeae are forced to use such foreign-sounding names as Pseudoroegneria and Pascopyrum and other tongue-twisters.

Crested wheatgrass has three ploidy levels. The commonly-known varieties of Fairway, Parkway, and Ruff are diploids. Nordan, Summit, P-27, and Ephraim are tetraploids. Both the diploid and tetraploid level offer opportunities for breeding improved plants. Some gain in forage production can be expected through conventional breeding within the diploid or tetraploid level. However, Asay in this conference predicted that even better cultivars may be developed by putting all ploidy levels in a common gene pool and developing breeds from that pool. One new cultivar, Hycrest, combines many of the desirable characteristics of Agropyron cristatum and Agropyron desertorum.

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SOME VALUES

Crested wheatgrass has many outstanding characteristics. It is a good seeder. The seeds are easily harvested and easy to establish in other locations provided a good seed bed is prepared. It is tolerant of a wide range of environmental conditions, especially those toward the drier end of the spectrum. Seeds are generally viable and produce vigorous young plants that can grow into maturity. Once established, crested wheatgrass competes well with other plant species and is especially good in retarding the reinvasion of brush. It produces high yields and responds well to nitrogen fertilization. It is of high nutritive value for livestock and provides needed green forage at critical periods of the year for large ungulates. It covers drastically disturbed sites such as roadsides and stripmines. Most of all, as Lee Sharp observed in this conference, it is a forgiving grass. It allows range managers to make mistakes and responds even after abusive treatment.

SOME PROBLEMS

The attributes discussed at this conference form a long list of impressive credentials for crested wheatgrass as a seeded forage grass. Most of the negative attributes discussed here are in areas other than that of producing livestock forage. There appears to be a botanical bigotry, a term coined by Ed DePuit, in the reaction of many people to crested wheatgrass. Because it is an exotic, it is excluded from seed mixes and seedings in many areas where it could perform effectively. There are some adverse reactions because it has been closely aligned with the livestock industry. In many cases it has been oversold as a wonder grass for nearly all range uses and problems.

A major concern is loss of wildlife habitat in areas seeded to crested wheatgrass. While it has been shown in Urness's paper that crested wheatgrass is indeed a valuable forage species for big game

animals during the early growing season, little has been said about other forms of wildlife. McAdoo, Evans, and Longland reported that conversion of shrub land to crested wheatgrass diminished the number of bird species and changed the avian species composition. Although no other papers were presented on wildlife, it can generally be assumed that conversion to a single-species stand will reduce diversity and eliminate many of the species of small mammals, reptiles, and birds that live in shrub lands. Some of these adverse effects may be mitigated, as for instance, by proper design of seedings to increase edge effect, but no papers were presented to show ways that wildlife habitat could be maintained.

Many people find stands of wheatgrass aesthetically displeasing. Comments have been made that the drill rows in many seeded stands persist after 50 years. There is fear that the Iowa farm has moved to the West. This is symptomatic of a major societal concern today: reduction in diversity. As resource managers, I believe we have grossly underestimated the public concern for diversity. We have been lulled into thinking that the quest for diversity was simply an attack on monocultures or a battle to save a few endangered species. It is not. It is part of a much deeper desire for diversity of thought, of communities, and of gene pools.

KNOWNS AND UNKNOWNS

It is clear to me that the positive attributes presented at this congress far outweigh the negative, showing that crested wheatgrass is indeed a valuable forage grass. But the status of crested wheatgrass is as dependent on what has not been said as on what has been said in this symposium. There are many questions that are still unanswered. For instance, where does crested wheatgrass fit in the synecology of rangelands? It has been pointed out several times that crested wheatgrass crowds out invaders once it is established. The species has been seeded throughout the Great Plains and Intermountain West, yet it does not invade stands of native grass but remains only where it was seeded. The ecophysiological data being gathered by Caldwell and Richards go a long way toward explaining why crested wheatgrass is resistant to grazing and why it is such an excellent competitor once it is seeded. However, there are not equivalent studies in synecology that would help to explain why it is not acting like a native.

Nothing was said here on how the effects of crested wheatgrass can be measured and evaluated for management. Where does it fit into range condition and trend studies? In many cases we have done a better job of making an economic evaluation of crested wheatgrass than we have a biological evaluation. Can this grass be fitted into successional schemes and evaluated like a native? Or must it continue to be treated as an introduced, seeded species, with separate rules for its behavior from those of a native wheatgrass?

Little was said at this conference about where crested wheatgrass fits into livestock management schemes. A. K. Majors discussed the need for flexibility in management and documented a number of successful schemes in the Pacific Northwest. In the end Majors maintained that crested wheatgrass would succeed only through flexible management schemes that depended on the experience of the manager. Peter Markgraf and Tom Bunch advocated heavy, "shock grazing" of crested wheatgrass to "clean up the mess." Their experience showed that crested wheatgrass could withstand extremely heavy grazing. Jack Pierce outlined the use of the species on his ranch in southern Idaho, where it fills a valuable niche in the year-round grazing scheme. Even with these fine papers, much was left unsaid about the value of crested wheatgrass in livestock management operations. Is it only a spring-fall species? Where does it fit in winter grazing? How will it respond to yearlong grazing?

There is a current fad for short-duration high-intensity grazing management schemes. Little is known about how crested wheatgrass will respond to such management systems. Can mixed species-stands, including crested wheatgrass, be maintained under intensive management?

Not enough was said about the place of crested wheatgrass in multiple-use management. DePuit's paper on its use in rehabilitating drastically disturbed lands covered a role other than forage; but here, too, the discussion was about a specific use, and not in a multiple-use context.

WHERE NOW?

What does the future hold for crested wheatgrass? This conference has reaffirmed that crested wheatgrass is a proven performer in the field of providing livestock forage. It is especially good for spring-fall ranges and areas where rainfall is limited. Any land manager, on either private or public range, can proceed with confidence to design seedings and management schemes based on what is known about crested wheatgrass.

Crested wheatgrass is a good grass. Much can be done without any new research. However, we must be careful to stick to what is known and recognize the limitations of the species. Don Dwyer, in his introductory paper at this conference, stated that the Russians have made three major contributions to the western United States--vodka, ballet, and crested wheatgrass. A trip to any bar will substantiate that vodka is making its own dubious contribution to the western way of life.

Although ballet may not be as widely accepted, Mikhail Baryshnikov is one of the greatest athletes in America today. His body is in almost perfect physical condition. His every move shows grace and power. We do not expect, however, for him to turn his athletic prowess to winning the decathlon. I do not think he could play point guard on the Philadelphia Seventy-sixers. He would probably make a poor tight end for the Dallas Cowboys. He might not even be able to fill the role long reserved for foreigners and kick a field goal for any NFL team. He is a great athlete, but he does his best when he sticks to his chosen field, ballet. Similarly, we cannot expect crested wheatgrass to play in a game for which it is not suited. We have a proven seeded forage species. We must use it appropriately.

There is much new knowledge that needs to be developed. Crested wheatgrass is an almost ideal

species for at least two areas of research. The first is the development of ecological theories and principles for management. The work by Richards and Caldwell is a good example of using the proven grass species to develop ecological theory from the internal workings of the plant. Unfortunately, similar synecological data are not available. There is a need for a number of specific studies to determine where crested wheatgrass fits in successional schemes. Why has this species not become naturalized or become a pest? Crested wheatgrass could be a test species for determining a number of theories on introduction and adaptation of an exotic species to a native successional sere. It could be used to test many hypotheses in synecology and diversity theory.

Crested wheatgrass is also an ideal species for research on special grazing systems. The fact that it is a very forgiving species would allow researchers to test radical grazing management theories that might otherwise destroy valuable stands. Not only would more information on management of the species be developed, but some generalizations and principles should emerge from studies of special management schemes on crested wheatgrass.

In conclusion, crested wheatgrass is a good but limited species. Its positive attributes far outweigh its drawbacks. It does some things extremely well, but like Baryshnikov, it is a specialist. It is not the wonder grass that will save the western ranges from deterioration. What it can do is fill a niche as a badly needed producer of reseeded range forage.

There are many areas where present knowledge can be implemented immediately. My recommendation would be to continue to use crested wheatgrass as a seeded forage species. There are many areas of new research that could add to our understanding. These range from basic biological questions to those of perception and acceptance. This conference has done a good job of summarizing what is known about crested wheatgrass. It is up to us now to apply that knowledge and to fill in the gaps with new studies.

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