PROCEEDINGS SUMMARY AND SUGGESTIONS FOR FUTURE WORK

Tony Svejcar

The overview of Integrated Weed Management provided a nice framework for the rest of the papers in this symposium. If we are to have any success limiting the spread of perennial pepperweed, it will be necessary to use all the available tools and information. It will be necessary to take preventative steps, and control populations where they currently exist. Given the costs of control and the limited resources, there must be some strategic planning to ensure that money is spent where it will do the most good.

Many of us know from experience that perennial pepperweed is a very prolific plant and develops a dense mat of creeping rootstalks (rhizomes). Research from the Agricultural Research Service (ARS) group in Reno, Nevada, showed that perennial pepperweed rootstalks would sprout even when cut into one-inch segments. The sprouting ability explains why tillage treatments are not effective at controlling this species. The research from Reno also demonstrated that rootstalks from 2,4-D treated plants sprouted at a lower rate than those from untreated plants. However, the rate of sprouting in the 2,4-D treated plants was still sufficient for perennial pepperweed to completely recolonize a site after spraying. This result helps explain why 2,4-D spraying tends to provide only temporary control.

Biological control has potential in cases where a weed has become widespread, and/or where control efforts have been only marginally successful. The theory behind biological control is that many plants are kept in check in their native setting by natural enemies (usually insects or diseases), but when the plants are introduced into other regions, the enemies may be absent. If an effective enemy can be found in the plants native setting it may be possible to introduce that species to help keep the weed in check. The idea seems simple, however, in practice there are a number of major obstacles. The genus to which perennial pepperweed belongs also contains a number of threatened and endangered species, as well as important cultivated and ornamental crops. Any potential biological control agent will have to be proven harmless to other members of the genus. As mentioned in the chapter on this subject, biological control should be viewed as part of an Integrated Weed Management approach and is generally not a solution by itself.

The last five papers in the proceedings summarized the experiences of researchers and managers from five different states. The emphasis was primarily on herbicide control, and there were similarities in the results. It appears that once an area is infested with perennial pepperweed 2,4-D will provide only short-term control. In one paper it was suggested that two applications of 2,4-D per year, for three to six years are required to eliminate perennial pepperweed from a site. It is possible that 2,4-D will be useful in controlling small introductions, but even that is not certain. There was consistent success with the sulfuronal herbicides, Telar® and Escort®. In fact, the success of these two herbicides was almost universal. These herbicides became available relatively recently and some fine-tuning of their use may be expected. There are still questions about the minimum rates necessary to control perennial pepperweed. With the cost of these herbicides, rate becomes a very important economic consideration. The research from Utah indicates that as little as 1/3 ounce per acre can be effective on some sites. It appears that 3/4 to

1 ounce per acre is the rate most commonly used. The sulfuronal herbicides exhibit both foliar and soil activity, which greatly expands the application-window compared to 2,4-D. As with all herbicides, please read the label to determine if any specific restrictions apply to your area.

There is a great deal of interest in controlling the spread of perennial pepperweed. This species threatens to, or has already invaded many of our most productive habitats. It is clear that no simple cure to the perennial pepperweed problem is likely. A combination of prevention and control techniques in well-coordinated Integrated Weed Management plans will be necessary to successfully halt the spread of perennial pepperweed. Because of the complexity of introducing biological control agents, that is one tool that will likely not be available in the near future. However, the sulfuronal herbicides provide an effective option not previously available. I would like to again emphasize the importance of developing an overall plan at whatever level you are working, i.e., ranch, drainage, county, or region. Limiting the spread and controlling small introductions will always be more environmentally and economically effective than waiting until a large-scale weed infestation has occurred.

Suggestions for Future Work

There has been little research on perennial pepperweed compared to many other important weed species. That may be because of the relative recentness of the concern over this species. There are many suggestions that could be made for future work. I will mention only a few.

A number of practical questions need to be answered:

1. What is the most economical application rate for the sulfuronal herbicides and at what intervals will treatment be necessary?

2. Is it possible to design haying treatments that will limit the production of viable perennial pepperweed seed?

3. How does the rumen influence seed viability, and how quickly do pepperweed seeds pass through the rumen?

4. What effect does defoliation at different growth stages have on perennial pepperweed? We know short-term mowing treatments are ineffective, but could long-term grazing treatments have potential for success?

5. Are there potential biocontrol agents that might be tested? This area will require both practical and basic biology research to be successful.

There are also some basic biology questions that might assist in designing perennial pepperweed control strategies:

1. How quickly does a seedling become an established patch? What is the basic