A Preliminary Assessment of the Economic Impact of Leafy Spurge in Manitoba

Fattaneh Zehtab-Jadid and Guy Landry
Department of Economics
Brandon University
Brandon, Manitoba

Leafy spurge is a noxious deep-rooted perennial that was first introduced in North America through contaminated grain imported into the state of Massachusetts in 1827. It has spread widely and now occurs particularly abundantly on the Northern Great Plains of the U.S. and the prairie provinces of Canada. It is threatening Manitoba's economy (agriculture most directly) and is of special concern to ranchers, farmers, land managers as well as park managers and the recreation and tourism industries.

340,000 acres of land in the province are impacted by leafy spurge infestation, the vast majority of these acres being either moderately (30-69% infestation rates) or severely infested (70-100%)

According to the 1999 report of the LSSG, 340,000 acres of land in the province are impacted by leafy spurge infestation, the vast majority of these acres being either moderately (30-69% infestation rates) or severely infested (70-100%). The 340,000 acres of infested land includes 225,000 acres of grazing land, 107,000 acres of public land and 8,200 acres along roadways and right-of-ways.

In Manitoba alone the direct and secondary impacts on grazing land, public land and right-of-ways are estimated at $19 million per annum.

Control Methods for Leafy Spurge

The rate of infestation has already reached alarming levels in Manitoba. Given that both experience and leafy spurge expansion models developed in the U.S. suggest a doubling of infestation levels every ten years or so, the prospects of uncontrolled growth for Manitoba's agricultural economy are alarming.

A number of methods have been tried, sometimes in combination with each other, to control the spread of leafy spurge. These include: herbicides, multi-species grazing involving sheep and/or goats (who consume and are even said to thrive on leafy spurge), mowing and burning, plant competition, and biological controls. Except in limited use or as a part of an integrated plant management mix, chemicals may not be very cost-effective and raise environmental questions. Grazing helps with reducing the rate of spread of the weed but doesn't by itself truly control (much less eradicate) it. Plant competition experiments are still in the early stages. Mowing and burning alone have not proved to be very effective. To date the most promising avenue of control appears to be the use of biological controls.

The use of insect predators on leafy spurge (and particularly various subspecies of *Aphthona*, the flea beetle) has become very widespread in the Upper Midwest of the U.S. It has been tried before in Canada and is now being tried and studied in a systematic and scientific manner by Pauline Morton, Jennifer Pachkowski and others working under the umbrella of the Leafy Spurge Stakeholders Group and the Rural Development Institute of Brandon University.

It is important to note that because of the existence of predatory insects and plant competition in Europe, leafy spurge is not regarded as a problem in its native land. However, the problem faced by Manitoba (and the rest of Western Canada) is huge, and to date very little in the way of resources has been directed to controlling it.

According to one Manitoba Weed Supervisor, Manitoba might have an annual control budget of $70,000 (none of it is from the provincial government).[1] Historically, Manitoba has had a progressive weed control program. The province passed weed control legislation in its first session in 1871. The provincial weed commission was established in 1916. In 1960, the responsibility for the Noxious Weeds Act was transferred to Manitoba Agriculture's Soil and Crops Branch. By the late 1980's the Manitoba government contributed $12,500 per year to weed districts to help cover the costs of a full time weed supervisor. But as part of a cost-saving drive, the program was phased out in two years in the early 1990s.

In comparison, North Dakota has a $4.7 million program using chemical and biological controls.[2] In the U.S. the biological control program was implemented in the Upper Midwest in 1988. It is perhaps too early to make any final judgements on the effectiveness of the program, but a recent study estimates that 65% of 1.85 million acres in four states (North Dakota, South Dakota, Wyoming and Montana) will be controlled with biological control programs by 2025.[3] The primary and secondary economic benefits of the control programs were estimated at $58.4 million U.S. dollars (1997 dollars), annually in the four states.

Toward a New Program

The LSSG study confirms, in a preliminary form, what has become common knowledge in the rural community: the effects of leafy spurge infestation are widespread and generate heavy financial losses to the rural economy directly and indirectly to the rest of the Province of Manitoba. An obvious implication of this is that the current limited hit-and-miss approach to control has to be replaced by a systematic and coherent program with adequate long-term funding if there is to be a measurable impact on the problem.

The provincial government in particular has to be awakened to the damage that leafy spurge is doing to the provincial economy and to its responsibilities in this area. Since the problem is widespread across the country, there would appear to be a strong need for

---

[1] Manitoba Cooperator, March 23, 2000, p. 21, vol. 57, No. 33.
[2] *The Western Producer*, June 3, 1999.
[3] Bangsund, Dean A., Leistritz, F. Larry, F. and Leith, Jay A.. "Predicted Future Economic Impacts of Biological Control of Leafy Spurge in the Upper Midwest." *Agricultural Economics Report.* No. 382, Nov. 1997, North Dakota State University.

involvement on the part of the federal government if we are to deal effectively with this issue.

What can we expect from our provincial and federal leaders? There are some encouraging signs but there are serious questions that arise as well from recent developments.

The story begins with a Joint Council meeting of Federal, Provincial and Territorial ministers of wildlife, forests and fisheries and agriculture held in September of 2001. At this meeting the ministers called for the development, by the fall of 2002, of a draft plan to address the threat of invasive alien species. Subsequently a national workshop on invasive alien species was held from November 5 to 7 of 2001 at the Canadian Museum of Nature in Ottawa. There were 140 participants at the workshop, representing 14 federal departments and agencies and 11 provincial and territorial ministries, as well as representatives from municipal governments, aboriginal groups, inter-government organizations, environmental and community-based NGO's, business and industry, and universities. The goal of the workshop was to aid in the development of a national approach for managing invasive alien species.

A document based on ideas and recommendations arising from the workshop was issued on September 25, 2002. Called *Addressing the Threat of Invasive Alien Species: Toward a National Plan*, the document states that it . . . "is intended to provide an integrated, comprehensive approach for the management of invasive alien species." It is important to note that the document itself is not a detailed national plan but rather a framework from which a national plan will be developed.

The first of the eleven principles guiding the development of the National Plan reads as follows:

> The National Plan will place a priority on the prevention of new invasions, but it will also support eradicating, containing, and controlling established invasive alien species where they are having, or are likely to have, significant environmental or economic impacts.[4]

While the latter part of this sentence may be encouraging to those who would like to see a dedicated and well-financed program to deal with established invasive species such as leafy spurge, other parts of the document are not nearly as encouraging.

For example, an earlier part of the document lists the three strategic goals. These are:

> 1) Integrate into individual, stakeholder, and government decision-making consideration of the impacts and potential impacts of invasive alien species on biological diversity and the environment.
> 2) Across sectors, coordinate and integrate actions to address legislative, policy, and program gaps and to respond effectively and efficiently to new invasions and pathways of invasion.

[4] Addressing the threat of Invasive Alien Species: Toward a National Plan, p. 10.

> 3) Strengthen programs to protect natural resources that are under pressure from increased global trade and travel.[5]

The three strategic goals have apparently little to do with economic impact of already established invasive species.

While there are other sections of the document that refer to measures to eradicate, contain and control invasive alien species that are currently established, the impression one is left with is that the priority of the national plan will be to prevent the introduction of new invasive alien species through a system designed to ensure 'biosecurity'.

We are particularly struck by the near absence of concern with issues involving economic costs and benefits. That may arise from the makeup of the 140 persons who attended the national workshop of November 2001. Of that group, as best as could be determined, there was only one person who was a working economist (myself). It may well be that returns on investment in controlling and managing established invasives may be much higher than just trying to shut the gate on new entrants, but this issue is not addressed. This is not to argue against measures that would protect our environment and our economy from future invasives, but in the struggle for resources, those who are concerned with leafy spurge and other established invasives may find themselves short-changed.

The Research Agenda

It is clear that there is a growing gap between research efforts here in Canada and those in the United States. Sustained research efforts in a number of disciplines are required if we are to develop adequate and effective control and management practices. For example, while much information has been developed in the U.S. from research on the biological and economic fronts, relatively little is being carried out here. Perhaps most needed are long-term tests and trials similar to those carried out in the U.S. to ensure that the results U.S. researchers obtain are transferable here where soil, moisture and climatic conditions may be somewhat different. For example, would ground covers that appear competitive with leafy spurge in Montana work (or perhaps even survive) here? Would flea beetles which proliferate at certain sites in North Dakota survive and spread as well in Manitoba? In so far as economic analysis is concerned, there is an obvious need to bring up to date the data estimating infestation levels in Manitoba and the consequent economic harm using parameters that more closely reflect the realities here. We need to develop and use data that shows the impact of reduced cattle grazing on producers' incomes and expenditures on inputs in Manitoba. We need data that correctly reflects carrying capacities here, and we need to use input-output data that reflects flows in Manitoba rather than in North Dakota to properly measure secondary impacts. In this last case, it seems that the Canadian input-output model shows that the secondary impact of expenditures in the Manitoba agricultural sector is more in the order of 1.67 rather than 2.2, for example.

Other areas economic analysts need to address include developing models to begin the task of measuring costs and benefits of different control regimens and the economic impact on different entities in the economy. As an example, it would be of interest to

---

[5] Ibid., p. 7

develop estimates of tax losses to local, provincial and federal governments due to reduced agro-economic activities because of the negative impact of leafy spurge on income generation in rural communities. Another basic need is to collect, review and evaluate all the available information on the various tests, experiments and programs implemented in Manitoba in the last twenty or so years. Most of the results may be expressed in only qualitative terms, but they may nevertheless be very informative. What they represent is the beginning of a data and knowledge base from which future studies and control programs may benefit.[6]

There is much that needs to be done before we in Manitoba, and in the rest of Western Canada, can come to grips with leafy spurge. There are important political, organizational and implementation goals that must be achieved. The process has begun, and this conference is testimony to that. Let us hope that frustration at the slow rate of progress doesn't set in at this point. We need to keep in mind that we have a serious and costly problem on our hands and that a continuing effort could reap significant rewards for the whole Manitoba economy and therefore for all of us.

[6] Zehtab-Jadid, F., and Landry, G. "Tests, Trials and Tribulations – A Survey of Leafy Spurge Control in Manitoba." (in progress)