Range Management Education in Canada

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Range management education has come a long way in Canada in the past three decades. In spite of this progress it is a far sight from the powerful academic discipline that one observes in the United States.

Range management is a broadly based integrative discipline that cuts across the normal scientific disciplines of ecology, physiology, genetics, biochemistry, and biotechnology of the plant and animal sciences. The unique integrative, ecological, management orientation of range management has placed this discipline at cross purposes with the traditional Canadian university system of agricultural and scientific education. Range management aligns itself better with wildlife management and other resource management disciplines where sustainability of the resource base is emphasized more than in high technology, production agriculture, or forestry. Traditionally, Canadian agricultural education virtually ignored ecology. Now, production agriculture is frequently criticized by agricultural education virtually ignored ecology. Now, production agriculture is frequently criticized by urban-based, environmental organizations. The conservation and environmental movements are forcing higher education to consider an integrated, more sustainable approach to resource management rather than accepting the narrower, more focused, disciplinary approach. In a sense, range management education came into the Canadian university system ahead of its time.

The Canadian System of Education

Canada has its own system of education modeled principally after the British system. In addition there have been American and European influences. Canadian public schools graduate a student of reasonable academic caliber. Canadian universities set their own entrance standards and do not accept all high school graduates. Only students with sufficiently high grade point averages can enter university. In recent years, with reduced government grants and burgeoning enrollments, universities have tended to raise admission requirements.

Historical Background

Range management has been taught at the Universities of British Columbia, Alberta and Saskatchewan in western Canada for a few decades. Entrenched Canadian academic disciplines like animal science, agronomy, plant breeding, and soil science had little tolerance or understanding for an American-based, conservation-oriented discipline that integrates the management and science of grazing animal-plant-soil-climate relationships. This should be no surprise when one looks at the British and eastern Canadian agricultural models used to develop western Canadian agriculture. The British have a 4000-year history and Eastern Canada has a 300-year history of wrestling agricultural land out of the deciduous forests. Traditionally, this model looked at the native vegetation as inferior and something to destroy in order to plant “superior” European cultivars.

Range management came into the Canadian universities through the back door. It did not come into these universities because of farsighted academic visionaries. Range management came into the classroom because the ranching and rural agricultural industry requested or demanded it. Courses in range management were first taught in western Canada by professors who had little formal training in the discipline. Range management education was but one of many demands placed upon these professors.

Range management was first taught in 1939 by Dr. Bert Brink at the University of British Columbia. The ranching community had requested help following decades of overgrazing and the drought years of the 1930’s. In Alberta, Dr. Bill Corns started teaching range management in the 1950’s as a part of an applied crop ecology course. In Saskatchewan in the 1960’s, Dr. Bob Coupland started teaching a course in range management in response to a request from the Western College of Veterinary Medicine.

All of the current Canadian range management professors received their postgraduate education in the western United States. The author, a British Columbia native, and student of Dr. Brink’s, came to the University of Alberta in 1966. Dr. Mike Pitt, a Californian, joined the staff of the University of British Columbia in 1975 following Dr. Brink’s retirement. Then in 1986, Dr. Jim Romo, a Montana native, came to the University of Saskatchewan.

Present Status

University of Alberta

The range management program began to develop in
the late 1960's following the appointment of the first range management professor. Semester courses in principles of range management and an advanced range ecology-range improvement course were offered in the 1960's and 1970's. Further instruction and research capabilities developed when a range management technician was appointed. There are now four semester courses covering the areas of principles of rangeland conservation and habitat management; western Canadian and North American rangeland plants, and advanced rangeland ecology, range principles, and rangeland improvement.

Since range management is interdisciplinary, the traditional agricultural departments restricted the ability of individual professors in various departments to coordinating related courses. It took the leadership of a visionary dean, Dr. Fenton McHardy, an agricultural engineer, to overcome this entrenched position to enable the creation of a new interdisciplinary major. Grazing Management was started in 1972 as a new major within the B.Sc. Agriculture degree. It included range management, wildlife management, and pasture management. The major has been popular with students and employers for two decades.

**University of British Columbia**

A range management option has been offered through the Department majors of Animal Science and Plant Science since 1977. The only majors in the B.Sc. Agriculture degree are departmental majors. Currently three undergraduate courses are offered: introduction to range management, rangeland plant communities of North America, and a two-week field course in range management. Each student is required to complete an undergraduate research thesis within their area of specialization.

**University of Saskatchewan**

Saskatchewan has been the province in western Canada that has less appreciation for the wise use and conservation of native rangelands. Vast expanses of prairie and parkland have disappeared under the plow to make way for crop agriculture. Federal government forage breeders have been noted for their abilities to find exotic grasses from Asia and Europe to develop cultivars for hay and grazing. They tended to overlook the potential of native species for use on rangeland. Into this environment came Dr. Jim Romo in 1986, the first appointment to a range management position in the Department of Crop Science and Plant Ecology, University of Saskatchewan.

There is a strong departmental structure at the University of Saskatchewan. This restricts the ability of the range management instructor and his associates in the Department of Animal Science from developing more effectively coordinated course offerings. At present there is no range management option. One range management course emphasizes ecological processes, planning, grazing impacts and animal husbandry. Another deals with the management and uses of tame forage in cropping systems. Related plant ecology courses include graminoid taxonomy, introductory plant ecology, grassland biomes of North America, physiological plant ecology, vegetation management, wild land ecology, and plants and microclimate.

**Evaluation of the Current Status of Undergraduate Range Management Education**

The undergraduate range management education programs at the three western Canadian universities offer students an introduction to range management. One program offers more. No Canadian university can compare with major American educational institutions for breadth and depth of instruction and specialization in range management. Nevertheless, the basic requirements of the student can be met when adequate coverage is offered in principles of rangeland management, rangeland management planning, rangeland plant identification, rangeland ecology and grazing effects, and a capstone advanced rangeland management course. This would normally require four semester courses. Further explanation is required to indicate how this is feasible. Western Canadian universities are strong in the basic arts and sciences. For students who participate in the range management course offerings, these institutions are able to provide sufficient academic coverage in botany; zoology; animal, plant, and soil science; entomology; agricultural and natural resource economics; and wildlife management. Some universities also offer forestry, remote sensing, and hydrology. Under these circumstances, a smaller staff of range management professors is required. When the day comes that two or three range management professors are present in a western Canadian university, a reasonably complete undergraduate educational program can be offered in rangeland management.

It is difficult to evaluate how Canadian university graduates who have range management training compare with their American counterparts. There are many differences in educational institutions, employment requirements, and career opportunities. American universities seem satisfied with the academic level of most Canadian students who enroll for advanced studies. One can also consider the progress of the University of Alberta Range Team at the competitions sponsored by the Society for Range Management. Since the entry of the first Range Team in 1980, there have been relatively few years when the team placed in the lower one third of the Range Management Examination and the Range Plant Identification Contest. In the past 5 years, the University of Alberta Range Team has placed 1st, 2nd or 3rd in the Range Management Examination regardless of whether there were first time or repeating students. There have been several high placements in the Range Plant Identification Contest.

**Other Range Management Educational Opportunities**

Range management is offered to 2-year diploma students at Olds College and Vermillion College in Alberta. There is also some range management included within
natural resource course offerings at Lethbridge Community College.

In British Columbia, Caribou College has a proposal to offer range management within a natural resources program.

**Range Science Graduate Education**

The three western Canadian universities presenting undergraduate range management courses offer the M.Sc. and Ph.D. degrees in range science or range management. There is a non-thesis M.Ag. degree in range management offered at the Universities of Alberta and Saskatchewan.

Range graduate educational opportunities within Canada are limited by the current academic expertise of individual faculty members or their creativity in offering joint supervision with other specialists. Graduate students can obtain a reasonable mix of relevant basic science and more applied, integrated, resource management courses. Canadian universities have high expectations regarding well-planned and executed thesis research.

Currently the key limiting factor is the single range management professor to act as the graduate student's supervisor. Thus, only a small number of graduate students are enrolled in range management studies in Canada. Consequently, each year academically superior students go to the United States for their graduate education or they take advanced degrees in other disciplines.

Range science graduate programs emphasize the preparation of students as scientists or academicians. The emphasis is upon the student obtaining a solid knowledge base in the discipline as well as learning to conduct high quality research. In the past, the preparation of students for careers as administrators, resource managers, or extension specialists was usually considered to be of lower priority. The introduction of the non-thesis M.Ag. degree is a response to industry demand for extension workers who have a solid academic basis of knowledge without needing as detailed an exposure to research.

**Rangeland Management Extension**

There is an inadequate recognition of the value of the rangeland resources by the public and by government administrators. Many consider rangelands as being little more than wasteland. Thus the attitude promotes overstocking of conservation areas such as national parks as well as of both private and public grazing lands. There is the false assumption that the grazing animal (i.e., elk or cattle) is the crucially important part of the ecosystem, rather than the rangeland resource base that they depend upon. One of the primary roles of rangeland management extension is to change this attitude.

In Canada, extension is primarily the responsibility of provincial government departments rather than the universities. The minimal staffing of range management educators across western Canada markedly restricts their ability to provide information. The priority of provincial departments to provide range management extension service is often not very high. For example, in Alberta, the one Alberta Agriculture range management specialist has retired. He has yet to be replaced.

The extension role for university rangeland management educators is often effective through active leadership at the local chapter and section levels of SRM. The bulk of the rangeland management extension education is being carried out by graduates from rangeland management and non-rangeland management programs. An invaluable role in rangeland management extension is played by SRM members who have learned and applied the principles in a practical manner and now encourage their skeptical neighbors to do likewise far more effectively than can either professor or extension worker.

Consultants will likely play a more important role in rangeland management extension in the future than they do now. Of course, they restrict services to those able to pay.

**Problems**

The current financial difficulties at Canadian universities will continue. Millions of dollars are being slashed from federal transfer payments to the provinces. There is a complex federal-provincial tax sharing arrangement for university education that seems flawed. Grant funding for applied field research has been reduced. Yet this is the principal source for graduate student thesis research. There is a tendency for the principal federal granting agencies to support medical research and high producing "cream of the crop" laboratory scientists while inadequately funding field-oriented research such as that done by most range management graduate students. The heavy emphasis upon laboratory-oriented, theoretical science in both basic science and medicine may be good for Canadian prestige within the world research community, but it frequently doesn't address the needs of goal oriented, field research. Recently, the federal government has begun to recognize the importance of supporting mission-oriented industry-researcher linkages. There may be a future in Canada for university researcher-ranching company linkages that will benefit the public and the discipline.

Universities often do not recognize adequately the contributions being made to a discipline by qualified technical staff. In field oriented, applied disciplines such as rangeland management, it is imperative that an adequate number of technical staff be available to support teaching and research initiated by professors. My own experience reveals that a 1:1 ratio of range professor to range technician is extremely effective. Universities need to appraise the new economic realities. It is often more practical to hire qualified technicians to support existing professors rather than to hire professors to do technical work.

In each western Canadian province there is legislation governing who can practice agrology (professional agriculture). Normally, a B.Sc. degree in agriculture and three years of practice in the field qualifies one for the professional agrologist (P.Ag.) status. A similar scheme exists
for forestry. Unfortunately, this does little to prevent government departments from hiring unqualified or under qualified staff for range management positions. When agencies accept personnel broadly trained in agriculture or forestry for range management positions, it undermines the discipline and it ignores the legitimate needs of the client.

**Future of Range Management Education in Canada**

The urban dweller normally thinks of a range as a kitchen stove. Thus in response to changing times, we should refer to education in our discipline as rangeland management or rangeland resource education.

Rangeland management education continues to respond to the rapid changes taking place in North American society. Historically, the discipline was linked to the livestock industry rather than to the rangeland resource. In the future, rangeland management education should place more emphasis on an understanding of the resource rather than on the users of this resource.

Western Canadian universities have had difficulty adapting to the introduction of rangeland management. The resistance of established disciplines has been substantial and has reduced the potential effectiveness of the programs. The environmental movement and fiscal restraint are both forcing agriculture and forestry to reevaluate concepts as it relates to the sustainability of the natural resource. Generally, this new emphasis will be compatible with the goals of rangeland management education.

Rangeland management is but one member of a group of disciplines dealing with the natural and renewable resources. Amongst these disciplines, however, it is the only one that emphasizes the development of an understanding of the effects of grazing and browsing on ecosystems. It is likely that the restructuring of university programs will continue to encourage more integration of related disciplines.

At the University of Alberta, the Faculty of Agriculture and Forestry has completed a major review and restructuring of all B.Sc. degree programs. A new degree program in Environmental and Conservation Science starts accepting students in 1993. Rangeland management will transfer to this new degree program as a component of the Wildlife and Rangeland Resources major. Rangeland management courses will continue to be available to agriculture and forestry students. Also, it is projected that more basic science students will enroll. Similar changes are expected to occur in other western Canadian universities.

Today, there are two powerful opposing forces at work in Canadian universities. One is the growing public awareness and concern for the environment. The other is the realization that the country as a whole has serious financial problems that must be dealt with. The public's concern about the environment should promote a rapid expansion of rangeland management education whereas fiscal restraint will limit growth for the foreseeable future.

Financial restraint will likely continue. It will force university educators to devote more time to classroom instruction, teach larger classes, while being assisted by fewer support staff. Educators will probably spend more time in administration and devote less time to postgraduate students and to research. Funding of postdoctoral research will likely decline. What funds remain for research will probably be mostly mission-oriented. Should the trend continue for university educators to be expected to produce more without adequate support, there will be a reduction in quality of education, it will take its toll on personal health, and it will result in a considerable shift of quality professors out of the universities into less demanding but more rewarding positions.

Publicly funded endowments will be more important in supporting university education than in the past. The day is gone for only government to support public university education. Traditionally, only high profile, private universities or high profile disciplines such as medicine sought donations from large corporations, foundations and the general public. This will change.

Rangeland management education emphasizes the wise use of one of the world's major land resources. There is a strong sentiment on the part of the citizenry that the management of such resources be sustained and improved. Financial support for areas such as graduate student thesis research, the field trips required in rangeland management courses, and Range Team costs for students to participate in Society for Range Management sponsored competitions are of high priority for further financial support from sources outside the university. Rangeland management education is of the nature that some foundations, corporations, SRM members, and the general public will assist in the establishment of endowments that will enable the perpetual support of key educational endeavors.