Actual situation and problems in conservation policy and practice in North America

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Summary
Active conservation of animal genetic resources in North America has been mostly conducted by 'grassroots' organizations comprised of hobbyists and farmers. The American Minor Breeds Conservancy in USA and Joywind Farm Rare Breeds Conservancy in Canada have been the major participants. They have made a very major contribution to conserving rare and relic breeds of livestock and poultry. National governments are now becoming directly involved in conservation work. Both Canadian and US governments, through their agricultural research centres, have begun large-scale conservation projects. They will stress storage of information in data banks, cryogenic storage of gametes and zygotes, and storage of DNA.

Introduction
A report presented at 2WCGALP in Madrid (Crawford, 1982) reviewed the rudimentary status of animal genetic resources conservation in North America at that time. Governments had little involvement and little interest in the problem. Activity among private individuals was only poorly organized, although public awareness of conservation concerns was developing. Information on status of genetic stocks within each major species of domestic animals was very fragmentary and difficult to obtain.

There has been a remarkable change in attitude toward genetic conservation during the ensuing years, both among the general public and in official policy of governments. Two 'grassroots' hobbyist organizations, one in USA and one in Canada, have become very active and productive in identifying, gathering, multiplying, and conserving herds and flocks of rare breeds. In USA, governmental and advisory groups have made several studies of needs and rationale for animal conservation. Both Canadian and US governments are developing plans for large-scale conservation of animal genetic resources, stressing cryogenic storage of sperm and embryos; active collection and storage has not yet begun. All of these activities will be summarized here.

'Grassroots' conservation activity

The American Minor Breeds Conservancy (AMBC) is an organization of individuals interested in conserving animal genetic resources. Membership is about 2500, most of them living in USA, some in Canada, and a few in other countries. Offices are in Pittsboro, North Carolina. The organization was formed in 1977, and by 1985 it was able to engage permanent staff; since then it has been exceedingly active. Its emphasis has been on conserving rare livestock and poultry as living flocks and herds, particularly under private ownership by AMBC members. It has stressed stocks, including feral ones, that are uniquely North American.

AMBC has developed an attractive array of membership services to maintain interest in conservation work and to disseminate information. An eight-page newsletter 'AMBC' News is published every two months. A conference is held each year which includes a technical program, business, and social events. Regional
groups have been formed to foster activity at the local level. There is an annual show and sale, and frequent participation in other agricultural events.

A major and very necessary activity has been the preparation of a census of North American livestock and poultry, since no comprehensive survey existed previously. The livestock census (AMBC, 1985) identified over 80 breeds of cattle, pigs, sheep, horses, donkeys, and goats needing conservation action. The American Minor Breeds Notebook (AMBC, 1989) describes and illustrates most of these breeds. The census has facilitated the orderly planning and execution of conservation activity. To maintain currency, it is intended that the census be repeated at five-year intervals; it will next be taken in 1990. A similar survey has been completed for poultry stocks in USA (AMBC, 1987), to complement a Canadian inventory (Crawford, 1984). It identified 17 production-bred stocks of chickens, turkeys, ducks, and geese that warrant conservation action.

AMBC has been very active in promoting the keeping of minor breeds and in developing registries and herdbooks for them. Early examples which profited from this assistance include Milking Devon and Dutch Belted cattle. Activity concerning Florida Cracker cattle has been intense; a breed association and registry have been formed and blood typing of most of the animals has been completed. There has been similar action for several sheep breeds - Gulf Coast Native, Navajo-Churro, and Jacob. Registries are currently under development for Guinea Hogs, Fell ponies, and for Black Welsh Mountain, Wilshire Horned, and Leicester Longwool sheep.

A semen bank has been established for rare breeds of cattle. Some of the frozen semen has been designated as long-term store, and some is for current use. Breeds included are Milking Devon, Dutch Belted, Florida Cracker, Dexter, Red Poll, American Lineback, and Belted Galloway. Other cattle breeds and other species will be added in the near future. Although the main interest of AMBC is that of maintaining living flocks and herds, it is also considering prolonged storage of embryos, tissue cultures, and DNA.

North America has many populations of feral livestock. A survey of these is nearing completion, to replace the outdated inventory of McKnight (1964), and a technical conference on conservation of feral stocks is being planned. Several of these stocks are being bred by AMBC members, including Santa Cruz Island sheep, Ossabaw Island pigs, and San Clemente goats.

A recent major endeavor has been the establishment of a poultry conservation program, emphasizing production-bred strains of the 17 breeds identified in the census as needing protection (AMBC, 1987). There are currently 80 flocks enrolled in the program. Two breeds which are very rare, Dominique chickens and Pilgrim geese, are being given extra attention to increase their numbers and to increase vigor. Extra effort is also being made to establish breeding flocks of unimproved naturally-mating Bronze turkeys, which have become exceedingly rare in North America.

A second 'grassroots' organization, Joywind Farm Rare Breeds Conservancy, was formed in 1986 in Canada (Chiperzak, personal communication, 1990). It is located at Marmora, Ontario. The Conservancy is being developed as a resource centre and information clearinghouse, and as a working farm open to the public. It has been especially successful in attracting news media attention to help in raising public awareness of the need for conservation of rare breeds. There are about 400 supporting members spread across Canada, about half of whom are currently keeping rare breed livestock. There is a quarterly newsletter
'Genesis' for members, and an annual meeting and conference. A membership directory and a breeders' directory/inventory are in preparation. The latter will be helpful in counselling of members on breeds and stocks that warrant conservation action, which until now has had to rely heavily on the AMBC (1985) livestock census for USA and on an earlier preliminary inventory and assessment of Canadian animal genetic resources (Crawford, 1984).

Like AMBC in USA, the Joywind organization has developed a store of frozen semen from cattle. Twenty-eight bulls of eight breeds are represented, including samples from lines of currently popular breeds which have been discarded by A.I. companies. The Conservancy has established breeding groups of several rare breeds at its headquarters, including Kerry and White Park cattle, Berkshire pigs, and Jacob, Black Welsh Mountain, Karakul, Barbados Black-belly and Horned Dorset sheep. Blood typing and DNA fingerprinting are in progress for some of these in cooperation with laboratories elsewhere in Canada.

The work of these two 'grassroots' groups, AMBC and Joywind, deserves praise. In the absence of conservation work by national governments, they have used their own initiative in taking direct action to stem the erosion of animal genetic resources in North America, and they have raised public awareness of the issues and dangers involved. They have played a large role in convincing governments to begin now to take an active role in resources conservation.

POLICY AND PRACTICE OF GOVERNMENTS

The Canadian government has now committed itself to animal germplasm conservation work. It has been involved in conserving plant genetic resources for many years. The new work will be conducted by the Research Branch of Agriculture Canada in Ottawa (Shrestha, personal communication, 1990). Work began in 1989 and it is presently scheduled to continue for a decade. The intent is to undertake conservation of valuable genetic resources of the major livestock and poultry species in Canada. These include cattle, pigs, sheep, goats, horses, and poultry.

The first objective is to establish a Canadian Animal Genetic Data Bank. Except for poultry (Crawford, 1984), a thorough inventory of national animal genetic resources has never been taken. Neither has descriptive information on these resources been assembled. It is intended that the data bank will store color pictures, animal descriptors, and population statistics. It will be expanded at a later date to include information on exotic germplasm and transgenic animals. It is being designed so that it can be linked with other national and international data bases, including the EAAP/FAO Global Animal Genetic Data Bank in Hannover. The first inventory should be completed by 1992, and then it will be updated at five-year intervals.

The second objective is that of conserving genetic materials in a Canadian Germplasm Bank. Conserves will consist of DNA, frozen gametes, frozen zygotes, and live animals. Emphasis will be placed on storing frozen semen and embryos, where adequate technology exists as with cattle. Where present cryogenic storage techniques are inadequate, as for poultry species, live animals will be maintained. There will be ongoing research on storage technique and on regeneration intervals, genetic aspects of stored sample sizes, etc.

An eventual objective is to help in developing Canadian government legislation to ensure perpetuation of national animal genetic resources.
In USA, several governmental and advisory groups have considered the needs and rationale for germplasm conservation. The Council for Agricultural Science and Technology prepared a major report (CAST, 1984) urging that a national program be developed to coordinate the management of animal germplasm resources and encouraging the development of international programs. The Office of Technology Assessment prepared a report (OTA, 1987) for the US Congress on needs and technologies for maintaining diversity of plant, animal, and microbial resources. The National Academy of Sciences established a Committee on Managing Global Genetic Resources in 1986 (Ballachey, personal communication, 1988). Its purpose was to develop a global strategy for management and conservation of plant and animal resources. A series of reports arising from this very large study is anticipated in the near future.

The Agricultural Research Service (ARS), US Department of Agriculture, is now engaged in a large-scale program of germplasm research and conservation (Gerrits, personal communication, 1990). ARS personnel had previously played a leading role in the preliminary studies described above. The program is being carried out in five major parts: characterization and evaluation; inventory and data base management; cryopreservation of semen and embryos, including a cryogenic germplasm repository; gene mapping; genetic resistance to disease and parasites. It includes both livestock and poultry species. The total program has annual funding of about US $8 million.

ARS and the Cooperative State Research Service have now established a national US Committee on Conservation of Animal Germplasm, and appropriate subcommittees have been appointed. The committee is charged with outlining the needs, justification, and program of work to be undertaken. Particular emphasis is being placed on linking and networking with other national and global efforts.

REFERENCES