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NAPPO Position on Taxonomic Resources

Systematics is the science of identifying, describing, naming and organizing species and higher taxa within predictive classifications based on evolutionary relationships. As such, systematics provides the means by which species are recognized and is the essential framework for organizing and communicating all knowledge about organisms. As well, systematics is integral to achieving the goals of the International Plant Protection Convention (IPPC) and its regional organizations such as NAPPO. For example, the IPPC (1997, Article VIII, 1a) contains an obligation "to report the occurrence, outbreak and spread of pests that may be of immediate or potential danger."

Biodiversity collections must be comprehensive in order to accurately represent the presence and distribution of species over both time and space and are critical for documenting changes in the world's flora and fauna and investigating causal processes such as global warming, habitat loss and other human influences. Insects, arachnids, nematodes and molluscs are not bound by provincial, state or international boundaries and thus the capacity to deal with them must be maintained at a national level. Furthermore, even though users of systematics research often have urgent and critical needs (e.g., regulatory agencies), the realized financial or social benefits of systematics research and of collections are frequently not immediate or direct and are often taken for granted. For these reasons, developed countries assume responsibility for curating centralized collections and are major contributors to systematics research. National systematics programs are supported in Canada, Mexico and the United States. Among the largest in the world, the collections associated with these programs contain essential information on the hosts, habitats and life history linked to the specimens. They document the impact of species in agricultural, urban and natural ecosystems and provide baseline data for research on climate change and the impacts of agriculture and other human activities on natural habitats. Furthermore, the collections provide the essential research resources needed to discover and distinguish native and exotic species, to document their variability and distribution over time, and to provide a standard reference system for understanding the evolutionary relationships necessary for predictive classifications.

The mandate of the National Plant Protection Organizations (NPPO) [Canadian Food and Inspection Agency, Mexican Sanidad Vegetal, and the U.S. Animal and Plant Health Inspection Service] is to safeguard agricultural production and native fauna and flora from invasive species, mitigate the pest risk associated with imports/exports, and the health, welfare and security of North Americans. The National Collections and the associated systematics expertise are the primary resources available to NAPPO member countries that are comprehensive enough to provide the authoritative identifications, information and advice concerning noxious plants, insects, arachnids, nematodes and molluscs necessary to support this mandate. Collaboration among systematists in NAPPO countries has been essential to provide broader coverage of taxonomic groups that can be authoritatively identified.

Invasive alien species (IAS) are a significant threat to biodiversity and economic well-being. Globally, invasive alien species are estimated to have an economic impact of $1.4 trillion a year or 5% of the world economy. In North America, non-native species of insects are estimated to make up only 2% of the insect fauna but 40% of the

economically important species. Ecosystems modified by man, particularly agricultural monocultures, appear to be more impacted by IAS than undisturbed ecosystems. The introduction and spread of plant quarantine pests can cause the loss of export markets and may increase the costs of exporting agricultural products. For example, in Canada measurable costs due to invasive plants and plant pests are estimated at $7.3 billion annually to the agriculture and forestry industries, not including displacement or extinction of native species or effects on ecosystems. In the United States, it is estimated that economic costs associated with managing non-indigenous plants, arthropods and microbes are greater than $74 billion annually. Knowledge of the systematics of the flora and fauna of North America, and of the world is essential to document the impacts of IAS, climate change and habitat loss, and to support the development of policy which minimizes the impacts associated with these environmental risks while enhancing sustainable agriculture.

To help achieve the goals of NAPPO, the member countries should strive to enhance and utilize the existing body of systematics knowledge of pests, beneficials, and environmentally sensitive insects, arachnids and nematodes while protecting and improving agriculture, biodiversity, health and security by:

1) generating and disseminating new systematics knowledge on taxonomic groups that contain organisms that pose risks to North America's food production and ensure the sustainability of both agricultural and natural ecosystems;
2) utilizing biodiversity information to assess the potential impacts posed by agricultural practices, invasive alien species, climate change, and habitat loss on native species and biotic communities;
3) enhancing the National Collections of terrestrial arthropods, plants, fungi, bacteria and other organisms in order to improve our capacity to identify species and to document their distribution and changes over time and space; and
4) providing authoritative identifications, advice and information through the National Identification Services, databases, and other on-line information systems that integrate taxonomic data, and promote accessibility and the use of taxonomic and biodiversity information.

NAPPO recommends that each member country:

1) Maintain and enhance national collections of terrestrial arthropods, molluscs, plants, fungi, bacteria and other organisms to support regulatory actions and policy and to provide a data source for taxonomic research;
2) Actively promote and improve taxonomic expertise to ensure that a critical mass is maintained in each member country; and encourage collaboration among taxonomists in NAPPO countries;
3) Maintain the capacity to provide authoritative species identification in support of regulatory programs that safeguard agriculture and preserve native biodiversity.