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Plant Collection and Importation©

William R. Feldman

Boyce Thompson Arboretum, Superior, Arizona 85273-5100

Refugee French Huguenots started nurseries on Long Island fairly early in the colonial period, concentrating on tree fruits. John Bartram started the first North American botanical garden in pre-revolutionary times near Philadelphia. The international exchange of new plants for horticulture has classically been considered an unmitigated good. Many Old World crops, ornamentals, and weeds were brought to Arizona and the Southwest, first by the Spanish: e.g., olives, wheat, pomegranate, red brome grass, and later by the Anglo-Americans: e.g., eucalyptus, mulberry, citrus, cotton, and tamarisk. Arizona's nurseries, botanical gardens, and arboreta were instrumental in the introduction of non-native species into Arizona's ornamental horticulture: e.g., my institution, the Boyce Thompson Arboretum near Superior, was deeply involved in the introduction of species such as numerous *Eucalyptus* species, African sumac, various Australian *Acacia* species, *Aloe* species, etc.

Plant collection and importation in the past were quite informal. Permits were either not required or regulations were not enforced. One merely had to take seed out of a given country without declaring anything to the authorities. Similarly, seed and plants were often brought into the U.S. without any declaration at Customs. This situation began to change markedly about 25 years ago. At that time, international exchange of new plants for horticulture came to be considered as a qualified good thing.

The initial change came in relation to trade in endangered species, and was covered by CITES, the Convention on International Trade in Endangered Species, to which the U.S.A. is a signatory. This Convention covers both endangered plants and animals and is just now becoming deeply imbedded in the consciousness of Customs inspectors. Concern in this country about bio-safety issues has historically related to the introduction of noxious agricultural and horticultural weeds and diseases and has been regulated by the Animal and Plant Health Inspection Service - Plant Protection and Quarantine bureau (APHIS-PPQ) of the Agricultural Research Service (ARS). The Mission of APHIS-PPQ is to "safeguard agriculture and natural resources from the risks associated with the entry, establishment, or

spread of animal and plant pests and noxious weeds. Fullfillment of its safeguarding role ensures an abundant, high-quality, and varied food supply, strengthens the marketability of U.S.A. agriculture in domestic and international commerce, and contributes to the preservation of the global environment".

But, the above was only the beginning, enter the Convention on Biological Diversity, or as it is better known, the CBD. The CBD has three main aims and an underlying assumption. The three main aims are: (1) preservation of biodiversity, (2) sustainable use of biodiversity, and (3) fairness in access to germplasm and in the sharing of benefits arising from the use of that germplasm. The underlying assumption of the CBD is that nation states have sovereignty over the biodiversity located within their borders.

One way to view the situation is to use an electrical resistance model of germplasm flow between countries. In this model, resistance can exist to germplasm flowing either out of a country or into a country, and total system resistance will be the sum of both. In the past there existed very little resistance to the flow of germplasm either out of countries of origin or into countries of importation. The above free flow of germplasm is rapidly becoming a thing of the past. International exchange of new plants for horticulture is coming to be considered as a highly qualified good thing at best, and at worst as an unqualified bad thing in the minds of many who are instrumental in fashioning the regulatory environment.

To those of the above persuasion, the international exchange of horticultural germplasm is seen as a major threat to biodiversity, and so is directly relevant to, and governed by the principles of the CBD. Looked at in terms of cost/benefit or risk/reward analysis, those who hold these opinions feel that the inherent risks of introducing new species into horticulture far outweigh any potential benefits. Of course, as many know, the U.S.A. has not ratified the CBD, and in fact is the only major country not to have done so. But, there exists very substantial sympathy with the aims of the CBD within the Executive departments of U.S.A. government which are charged with regulating germplasm flow into this country. We in horticulture will have to take a pro-active and defensive posture as regards responsible management of the risks inherent in germplasm importation — more about this later.

Now let's look specifically at the field collection phase, keeping the CBD in mind. To begin with, a word about the CBD and the emerging climate of opinion "out there" concerning germplasm collection and export. Many in the developing world feel "ripped off" by the past collecting and commercializing activities of foreigners as regards their nation states even if the activities pre-date by centuries their existence as nation states. There exists resentment at the benefits garnered by foreigners from the exploitation of "their biodiversity". For example, the South Africans are upset about all the money that has been made from "their geraniums". In some countries, this is resulting in germplasm collection regulations that will have a hard time in living up to the CBD's "fairness in access to germplasm" criteria.

So, one needs to obtain permits, but from whom? Remember that nation states have sovereignty over their germplasm resources, and each country makes its own regulations viz-a-viz permitting. Following are some examples from my experience. In Turkmenistan, access to botanically important areas near the southern borders requires a special, hard-to-obtain internal visa from the Foreign Ministry. Additionally, special administrative measures prevail within the border zone. In this case, I was able to obtain general permission to collect and take out seed from the Minis-

try of Environmental Protection and Natural Resource Utilization, with clearances from the Plant Quarantine Office. A special addendum was needed to take out seed of rare or endangered species as per CITES. The above addresses the CBD issues of **preservation and sustainable use of biodiversity**.

Some countries, e.g., Mexico, require that the specific plant taxon be permitted in advance, and that a botanically qualified national be present in the field. This is a regulation that seems to limit access to germplasm. Whether or not this regulation constitutes **fairness in access to germplasm** is open to question. In the case of Turkmenistan, I verbally informed the Turkmen government that the seed would be used only for botanical garden display and study, and would not be passed on to a 3rd party or commercialized without returning to them to work out terms. This is known as *prior informed consent* and also addresses the issue of **fairness in access and sharing of benefits.** We also sent many scionwood samples of fruit and nut-bearing species to the ARS for back-up after providing the Turkmen authorities with written assurances of guaranteed, cost-free, future repatriation from the ARS, again constituting **preservation of biodiversity and fairness in access and benefits sharing.**

In the case of South Africa, while travel around the country is generally unfettered administratively, personal security issues need to be taken seriously into consideration. Legally, no part of a plant may be removed nor taken without a permit. Permits need to be obtained at the state level and one must obtain prior informed consent as to the purpose of the collection activity, e.g., if the purpose is biomedical screening that must be stated up front, and similarly if the purpose is horticultural commercialization or botanical garden display. It is said that permits can be obtained in advance via post or e-mail, but nonresponse is common. In Australia, permits are also obtainable at the state level, with similar provisions to those of South Africa as regards prior informed consent. Some countries require that prior informed consent be obtained at levels well below the national or provincial, like at the village level. The regulatory environment is very much in flux in many countries, and it is often unclear who's responsible. Communication between players within the country is often poor to non-existent, and opportunities for confusion and corruption abound. For example, in South Africa during the Botanical Garden Conservation International Conference in Sept. 1998, our National Botanical Institute (NBI) curatorial hosts were so paranoid about collecting germplasm that they wouldn't even discuss the matter with us, while in the next office seed could be purchased from the NBI's seed catalogue sales operation.

Following are some things to be aware of during field collection. Always keep land tenure and ownership in mind, just because you have a permit does not mean you have permission to be collecting at a given location. This constitutes common law and common courtesy. Take care to make precise notes as to the location of the collection site, soil type, associated plants and animals, etc. Take care to not negatively impact the site and not to take more than 10% of the seed or other germplasm of interest. For general purposes, it is advisable to obtain a broad site sample rather than heavily collecting from one or two individuals. This addresses sustainable use concerns. Take great care in labeling of samples, and store and ship samples in an appropriate manner and environment.

Concerning the importation of germplasm into the United States, let's recall that aim #1 of the CBD is the preservation of biodiversity. In the opinion of many within

the Federal Government, after habitat destruction, ecosystem disruptions resulting from the presence of *invasive alien organisms*, in our case plants, is the single greatest threat to biodiversity in the United States. I personally prefer the term *ecosystem weed* to invasive alien and I will use that terminology. An *ecosystem weed* then, is a plant that, by virtue of its introduction into a wild or relatively undisturbed ecosystem, results in the degradation of that system by undermining ecosystem processes in a hard-to-reverse way, thus reducing biodiversity. For example, quoting from a National Parks website fact sheet on *Melaleuca quinquenervia*, a potent ecosystem weed of the Florida Everglades: "Paperbark tree is an aggressive invader that spreads rapidly, converting native plant communities such as sawgrass marshes, wet prairies, and aquatic sloughs into impenetrable paperbark thickets. In a single year, one paperbark tree can produce a dense island hammock nearly 600 ft in diameter. It's greatest threat is to the Florida Everglades ecosystem, which faces extreme and possibly irreversible alteration as a result of intrusion by paperbark tree. Seeds of paperbark are spread by wind and water".

Paperbark was introduced into Florida early in the 20th century as an ornamental plant and to "dry out swamps," and exhibits some of the salient characteristics of ecosystem weeds: it is very rapid in terms of vegetative growth; very prolific in terms of reproductive growth; seeds are easily and widely dispersed; the effects on the ecosystem are very difficult to reverse; and it responds favorably to fire or other stresses. Many serious ecosystem weeds alter fire regimes, for example Red Brome grass and Tamarisk in our Arizona ecosystems.

Federal authorities are getting pretty jumpy concerning the importation of *alien organisms* into the United States. Witness the Executive Order issued in 1999, dealing with the subject of introducing destructive alien species into the U.S.A. But so far, the impact of all of this on the actual regulatory environment has been modest. As of the present, the main Federal concerns are still focused on keeping out noxious agricultural weeds, or plants that may be harboring pests or diseases of commercially important agricultural or horticultural crops. For example, a shipment of seed was sent from Turkmenistan to the ARS-APHIS at Beltsville, and one species, *Imperata cylindrica*, was declared a noxious weed. The plant then required a specific permit in order to be allowed in for research purposes only. Another species, a *Berberis*, was pulled because it is an alternate host for a plant disease causing problems in the upper Midwest. Another group of seed not allowed to pass were in the genus *Prunus* — these are of concern because they might be infected with viruses that could cause economic losses to U.S.A. fruit crops like cherries, peaches, or apricots, all of which are in the genus *Prunus*. It may be many years before these seed ever get to us. In the wake of 11 Sept. 2001, the long-standing regulation mandating that a phytosanitary certificate issued by the country of origin accompany each and every shipment of plant material into the U.S.A., is being strictly adhered to.

How does one obtain permits for the importation of plants into the U.S.A.? Permits can be obtained from APHIS at: U.S.A. Department of Agriculture, Plant Protection and Quarantine Permit Unit, 4700 River Rd., Unit 136, Riverdale, Maryland 20737-1236. Or, you can download the permit forms on-line at: <http://www.aphis.usda.gov/ppq/>.

The pertinent permits are: PPQ Form 587 — Application for Permit to Import Plants or Plant Products; PPQ Form 588 — Application for Permit to Import Plants or Plant Products for Experimental Purposes; PPQ Form 564 — Request for

additional mailing labels — for mailing plants or Plant Products from Overseas; and PPQ Form 525A — Application for Permit to Receive Soil. In the event that the plant germplasm is listed as being rare, threatened, or endangered, pertinent CITES documentation from the country of origin is required for entry into the U.S.A.

What about the future? We in horticulture need to anticipate an increasingly stringent regulatory environment as regards importation of horticultural germplasm, in particular as pertains to *alien invasive plants,* or potential ecosystem weeds. We need to anticipate an environment in which potential new introductions will be considered "guilty until proven innocent" and we will have to do the proving.

The following is a proposed plan of action. Growers and retailers will need to make a solid commitment to not grow or sell species with a known propensity toward ecosystem weediness within our bio-climatic region. There will likely be ongoing debates with those who will take a national as opposed to a bio-climatic approach to these issues. Germplasm of potential new horticultural plants will have to be brought into the United States under terms similar to that now covered by PPQ Form 588 — Application for Permit to Import Plants or Plant Products for Experimental Purposes. These plants will have to go through a multi-year screening process in order to determine their potential for ecosystem disruption and degradation. The screening will need to take place in an environment that provides a realistic potential for the expression of tendencies toward ecosystem weediness. The above will require from 5 to 10 years to accomplish.

Upon completion of the above screening period, a plant species would be released to the trade if the screening was conducted at a public botanical institution such as an arboretum or botanical garden. A modest fee — yes, a tax — needs to be levied upon all "green industry" transactions to be used to fund a mechanism for dealing with outbreaks of ecosystem weediness if and when they do occur. This fund would support the retention of qualified field botanists to organize and conduct field assessments of ecosystem weed infestations. These professionals could work with lay groups such as the Native Plant Society, Scouts, etc., to increase the number of eyes looking for signs of trouble in wildlands. When problem areas are identified, remediation efforts could be conducted in a manner similar to that being done in the Western Cape of South Africa where indigent persons are recruited, often from off the street, to work as part of an ecosystem weed removal crew, initially at a basement minimum wage level, and later at piecework rates as competence and enthusiasm grow.

By acknowledging the potential downsides to horticultural plant importation, and by pro-actively managing the risks — by becoming part of the solution and not just part of the problem, we can continue to provide a flow of beautiful and useful plants for the people of America without incurring undue risk to our wildlands and their biodiversity. We need to remember that gardening is the most popular hobby in this country — that the people are with us if we show them that we are responsible ecological citizens.