Name of Issue: ***In Situ* Genetic Reserve Methodologies**

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Highlights of discussion:

1. Active and passive conservation - A distinction can be made between 'active' and 'passive' *in situ* conservation. Plant species are undoubtedly conserved in numerous environments unlikely to be considered genetic reserves, such as areas of wasteland, field margins, primary forest, even national parks. However, in each of these cases the existence of particular species is coincidental and passive, and not the result of active conservation management. These populations are not actively monitored and as such, are more vulnerable to extinction. Thus, any deleterious environmental trend would be unlikely to be noted and counter measures adopted. In this sense active conservation requires positive action to promote the sustainability of the target taxa and the maintenance of the natural or artificial (e.g. agricultural) ecosystems which contain them, thereby implying the need for associated habitat monitoring, management and protection.
2. Methodologies have been proposed for the establishment of genetic reserves by: Maxted, N., Hawkes, J.G., Ford-Lloyd, B.V. & Williams, J.T., (1997). A Practical Model for *In Situ* Genetic Conservation. In: *Plant genetic conservation: the* in situ *approach* (eds. Maxted, N., Ford-Lloyd, B.V. & Hawkes, J.G.), pp. 545-592. Chapman & Hall, London.
3. Taxon Selection – The criterions used for selection of taxa are associated with:
   3.1. Socio-economic use - Harlan & De Wit (1971) gene pool concepts (GP1 then GP2)
   3.2. Threatened species
   3.3. Endemic species
   3.4. Current conservation status (both *in situ* and *ex situ*)
   3.5. Genetic distinctiveness and isolation of the gene pool
   3.6. Ecogeographic distribution (specialist species given priority)
   3.7. Cultural importance (such as rice in certain cultures)
4. Site Assessments – The criterions used for selection of genetic reserve sites are associated with:
   4.1. Important Plant Areas or Hotspots of plant diversity
   4.2. Diversity as indicated by ecogeographic and / or genetic diversity studies
   4.3. How large should the site be? Area is not important the main thing the population size, a minimum of 10,000 individual is needed
   4.4. The link to utilisation is vital and therefore ease of access is a consideration and distance from the research teams home location

4.5. Better to find a site that allows multiple species conservation as it will be more cost effective than single target species reserves
4.6. Sites would normally be established in existing protected areas to avoid the costs of buying land

5. Assessment of Local Socio-economic and Political Factors
   5.1. Sites would need some form of legal protection to ensure they can provide long-term security
   5.2. There is a need to check for development plans for the site before establishing the site, again to ensure long-term security
6. Reserve Design
   6.1. Sites should be large enough to contain at least 5,000-10,000 individuals of each target species to prevent natural or anthropogenic catastrophes causing severe genetic drift or population inviability. Sites should be selected to maximise environmental heterogeneity. Each reserve site should be surrounded by a buffer zone of the same vegetation type, where experiments on management regimes might be conducted and visits by the public allowed, under supervision. There is a need to consider public awareness when designing the site, so include visitor friendly features (walks, talks, posters, etc.).
   6.2. It maybe impossible to get 5,000 individuals for a disparate species, e.g. fruit tree species.
   6.3. For very rare species with small population size it may be necessary to use assisted propagation and introduction to build up population levels at the reserve site and so ensure sustainability.
   6.4. Assisted propagation may also be used to help stop wild collection, as with bulbs in Turkey.
7. Taxon and Reserve Sustainability
   7.1. Establishing and managing an *in situ* genetic reserve is resource expensive and therefore both the taxon and reserve must be sustainable over an extended period of time or the investment will be forfeit.
8. Management Plan
   8.1. The reserve site will have been selected because it contains abundant and hopefully genetically diverse populations of the target taxon. Therefore, the first step in formulating the management plan is to observe the biotic and abiotic qualities and interactions at the site. Once these ecological dynamics within the reserve are known and understood, a management plan that incorporates these points, at least as they relate to the target taxon, can be proposed.
   8.2. Care must be taken in implementing the management plan and especially the prescription to avoid damaging the target populations
   8.3. It is unlikely that any management plan will be wholly appropriate when first applied; it will require detailed monitoring of target and associated taxa and experimentation with the management plan before a more stable plan can be used. The plan may encompass several management regimes (a range of grazing practices, tree-felling, burning etc.) within the reserve. The example of the management of *Zea diploperennis* in Mexico was discussed.
9. Reserve Monitoring

9.1. Each site should be monitored systematically at a set time interval and the results fed back in an iterative manner to enhance the evolving management regimes. The monitoring will take the form of measures of taxon number, diversity and density as measured in permanent transects, quadrats etc.

10. Reserve Use

10.1. As there is a need to link conservation to use, the traditional users, along with the general public and other professional uses should be encourage to utilise the reserve.

10.2. The reserve forms a natural platform for ecological and genetic research, as well as providing educational opportunities for the school, higher educational and general public levels.

11. Linkage to *Ex Situ* Conservation, Research, Duplication and Education

11.1. There is a need to form links with *ex situ* conserved material to ensure utilisation but also as a form of safety duplication.

Future / Next Steps:

- There is a need for more case studies to test the methodologies being developed.
- There is a need for wider use of genetic reserves in Europe to conserve crop wild relatives