Verification of Germplasm Source and Status by Seed Certifying Agencies as Native Plants Are Collected and Cultivated

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Introduction Long-term success in restoring native species to a specific site or geographic area after natural or human-caused ecosystem disturbances is most likely when using adapted plant materials from the same site or nearby sites or areas with similar physical and biological environments . For some broadly adapted species characterized by copious seed production , wildland collection can supply a significant seed volume for direct plantings . For most species , however , accessions consisting of limited quantities of seed obtained from defined wildland stands must be increased in fields or nurseries . Unfortunately , accurate documentation for collection site and/or cultivated production has often been unavailable to those seeking site-appropriate native plant materials .

Methods and evaluation Four methods are potentially useful to provide verification that seeds or plants originate from a desired geographic area and remain genetically pure when cultivated . The author's evaluation of these methods according to speed , cost , reliability , practicality , and red tape" (paperwork trail) are shown in Table 1 and the notes below .

Table 1 *Verification methods evaluation .*

	SC	C/DNA	G-O	ACC
Speed	10	5	1	5
Cost	8	5	6	1
Reliability	9	9	5	7
Practicality	9	2	2	1
Red Tape	5	8	5	1

Scale : 10=Best , 1=Worst

Notes : Seed certification (SC) is the best method overall . It entails a moderate amount of paper work , but the cost to the producer is small relative to the value of the product , speed is instantaneous to the customer (involving only certification tag recognition) , reliability is high , and it has an excellent practicality track record . Chemical/DNA (C/DNA) methods can be cost effective per sample , but only after adequate sampling and testing to establish reference benchmarks for each native plant population (which is impractical) , and green material from seeds can take several weeks for germination and growth (though the actual test on fresh material is fast) . Grow-outs (G-O) can be reliable in distinguishing differing homogeneous populations (much less so with heterogeneous populations) and is relatively cost effective in limited applications , but one or more growing seasons are required and logistics on a large scale are impractical . Accreditation (ACC) has unlikely relevance to the typically small sized operations of native plant materials producers , as program evaluation and compliance costs are high , reliability is moderate , and the setup paperwork to standardize processes is onerous .

Discussion and conclusion The Association of Official Seed Certification Agencies (AOSCA) consists of non-profit government recognized organizations in the United States and several other countries that carry out seed certification (which entails third party monitoring of plant germplasm development and multiplication , utilizing field and facility inspections and documentation in order to maintain genetic identification and purity) . Several AOSCA documents , including Pre-Variety Germplasm Requirements and Standards" , apply specifically to native grasses , forbs , and woody plants . They describe four categories of germplasm that may be wild collected or produced in seed fields : Source Identified (yellow tag) = unevaluated germplasm identified only as to species and location of the wild growing parents ; Selected (green tag) = germplasm showing promise of desirable traits , having been selected either from within a population or as a comparison between differing populations of the same species ; Tested (blue tag) = germplasm for which progeny testing has proven desirable traits to be heritable ; Variety (blue tag) = distinctive traits documented as uniform and stable when evaluated over multiple locations and years . Germplasm status may be additionally described as natural track" (unrestricted natural accessions) , or as manipulated track" (germplasm that has been mass selected , recombined , or otherwise genetically manipulated) . Generation Zero (G0) designates unrestricted natural germplasm collected from a wildland site , while G1 designates the first generation produced under cultivation . Official seed certification programs provide a timely , cost effective , reliable , and practical avenue to maintain the genetic identity , purity , and status of native plant germplasm as it is collected , cultivated , marketed , and utilized for reclamation efforts on disturbed lands .

References

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