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State-of-knowledge on *Amburana cearensis* (Fr. Allem.) A.C. Smith (Leguminosae: Papilionoideae) for genetic conservation in Brazil

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Summary

This study explores the basis for conservation action on *Amburana cearensis* (Fr. Allem.) A.C. Smith (Leguminosae: Papilionoideae), a wide-ranging forest species occurring in Brazil, notably in the Caatinga and Cerrado regions, and other South American countries. It offers insight into the taxon through structured reviews of knowledge of its biology, ecology, silviculture and management. Widely scattered published reports are critically considered and efforts made to highlight and resolve contradictions and inconsistencies therein. Information about this species is scanty and scattered, particularly in respect to its biology and ecology. Because little effort has been applied to its domestication and improvement, knowledge of its silviculture and management is meagre. The taxon is typical of open and deciduous forest in the Caatinga and Cerrado. Gaps in current knowledge relevant for conservation are identified and steps to fill them proposed. Where in situ conservation proved to be more appropriate, recommendations are made for the location of additional protected areas. Ex situ and enrichment conservation action is highly recommended for specific parts of the range where resource losses are already so extensive that in situ measures alone are inadvisable. Provision for refining the limited management and conservation knowledge is made through highlighting priorities for study of the taxon. Finally, future action is discussed in the context of the infrastructure of the national conservation sector.

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Introduction

Conservation operating through in situ channels has, understandably, been ecosystem focused. There is, however, need to complement this with attention directed at particular target species. Here, this approach is developed for *Amburana cearensis* (Fr. Allem.) A.C. Smith, a forest species, which is typical of a distinctive but threatened habitat in central Brazil, the Cerrado, although not necessarily restricted to it. This taxon is included in the listing of 23 priority species for Brazil drawn up by the Brazilian Agricultural Research Organisation through its Genetic Resources and Biotechnology Research National Centre (Embrapa-Cenargen, 1988) for the Brazilian Government in connection with the national conservation strategy. Criteria for selection were those recommended by the FAO Panel of Experts on Forest Gene Resources: restricted ecological distribution, low population densities, heavy exploitation for wood and other products, unknown or deficient silviculture and threatened habitat (Roche, 1987).

Efforts to trace a robust but flexible standard system for acquiring, collating and organising information on named neotropical tree species were not successful. The reasons always reside in problems of standardisation of taxonomic and systematic nomenclature and regional peculiarities of (and particularly for wide-ranging) woody species, as well as the generally scattered nature of the acquired knowledge on these species. For example, in the *Forestry compendium* of CAB International (2000) *A. cearensis* is only briefly treated as an outline data sheet. However, Lorenzi (2000) provides an instructive account, including figures, of this species. Reference to World Conservation Monitoring Centre (WCMC-Kew, 1990) indicated that for other tropical areas the situation was no different. Since species are the targets of gene resource conservation, a structured review of existing knowledge has great appeal when conservation strategies are to be formulated. Accordingly, this paper offers a framework for such action, with *A. cearensis* serving as a case study.

The form and distribution of knowledge about tropical tree species introduce complications in information retrieval. Un-processed 'raw data' (for example, those recovered from herbarium holdings, ecological literature and species listings) need to be especially reviewed and critically incorporated into the progressing study. In an uncollated state, published information is often very dispersed, much (notably early references) being in obscure or poorly circulated documents. Various languages may be involved and reference may be made under obsolete names, which may reflect broader or narrower concepts of the species than those accepted today. For many wide-ranging species these problems are acute, making the preparation of a unifying account taxing, time-consuming and sometimes laborious. The exercise is nevertheless important as the basis of an authoritative conservation plan.

Few can claim familiarity with all aspects of the existing knowledge of a wide-ranging species: existing information about a species can be allocated in many fields, each the line of a different group of specialists: foresters, ecologists, geographers, botanists. Geographical spread complicates matters greatly. Much concern with species is at national rather than range-wide level. Differences in the circumscription and in the nomenclature of species need to be recognised (and perhaps reconciled) and taken into account as the information is integrated. Whether or not this can be achieved in a single step depends on the quantity of published and archival information (including herbarium material), on the species, as well as on the resources and time available to the investigator.

Aimed at producing a current state-of-knowledge account for the species to support genetic conservation programmes in Brazil, the present study has three objectives: (1) to review available information on the biology, ecology, silviculture and management of *A. cearensis* relevant to its genetic conservation as a sustainable resource; (2) to create a comprehensive and authoritative monographic account of the species by a critical analysis of available information, highlighting in the process unresolved misinterpretations and inconsistencies which need clarification; and (3) to identify the major gaps in current knowledge of the taxon and recommend positive research actions to fill them.

Methods

This paper is devoted to an in-depth account of the target taxon included in the programme of conservation of forest genetic resources in Brazil, which is typical of the Central Brazilian Cerrado region. Consequently, it has copious monographic content for the species. Comprehensiveness and authority have been sought by means of the extensive, though scattered information accessed and the scope of the review has enabled a clear picture of the species throughout the neotropics. Comprehensive comments on taxonomic and