Field surveys of priority crop wild relatives in three provinces of South Africa

Maluleke NL[1]*, Raimondo DC[2], Hamer M[2], Nkuna L[2], MagosBrehm J[4], Kell S[4], Dulloo ME[3], Thormann I[3], Jansen van Rensburg W[5], Mokoena ML[1]

1. Department of Agriculture, Forestry and Fisheries, South Africa
2. South African National Biodiversity Institute, Pretoria, 0001, South Africa
3. Bioversity International, 00057 Maccarese, Rome, Italy
4. School of Biosciences, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK
5. Research Council, Private Bag X 293, Pretoria, 0001, South Africa

*NkatM@daff.gov.za

Introduction

Crop Wild Relatives (CWR) are wild species related to crops containing potential source of traits that are valuable for crop improvement, nutritional values resistant to pests and diseases and abiotic stresses. CWR occur in the wild, natural habitat and are often threatened due to impact factors such as overgrazing, veld fires and mowing. The most effective way to protect them is to conserve them both ex-situ and in-situ. An inventory of their occurrence and distribution will assist to generate their occurrence data and current threat status within the country. The aim of this study was to validate and update the existing localities of the priority CWR within South Africa.

Objectives

1. To generate occurrence data of the priority CWR of targeted crops
2. To assess threats to the existing populations of the priority CWR of targeted crops

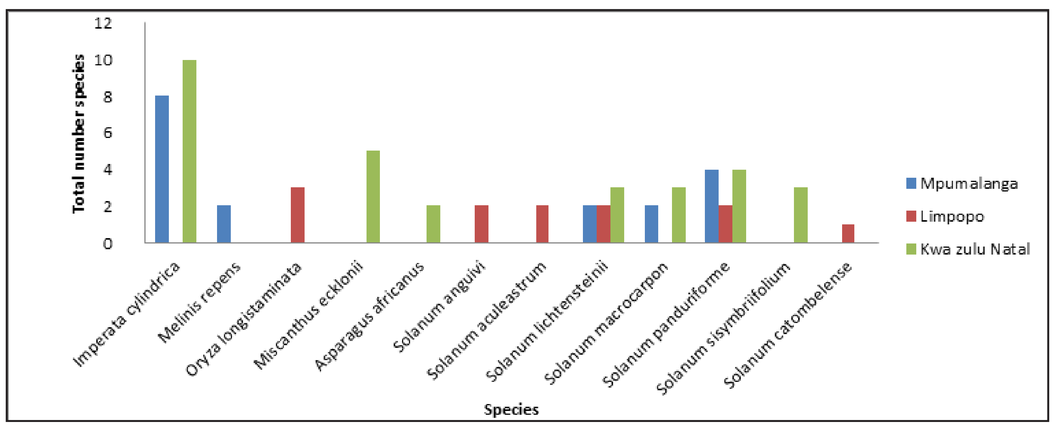
Materials and methods

Prioritisation was given to CWR with a collection record above 30 years and those poorly represented both ex situ and in situ in South Africa. Sampling was conducted along the road sides, protected areas and communities; using collection forms for data recording. A random sampling method was used to collect data using the collection forms. The targeted areas for the survey were protected areas and communities. Although there were targeted areas, most of the CWR were found along the road sides. Geographic Positioning System (GPS) was used to collect distribution data and herbarium specimen were collected and pressed on the spot. 31 priority species were targeted in Mpumalanga, Limpopo and KwaZulu-Natal provinces of South Africa.

Results

In the Mpumalanga Province: 18 localities of priority CWR were recorded along the road sides, private land and protected area with the highest locality of Imperata cylindrica (45%) and Solanum panduriforme (22%). In Limpopo: 12 localities were recorded near the community, along the road sides and inside the protected area with one locality having the highest occurrence of Oryza longistaminata (25%) inside the protected area and Solanum aculeastrum (17%), Solanum anguiva (17%) and Solanum lichtensteinii (17%) along the road sides. In KwaZulu-Natal: 34 localities were recorded along the road sides and private land with highest locality of Solanum spp (47%) (sisymbriifolium, lichtensteinii, macrocarpon, panduriforme, aculeastrum,) and Imperata cylindica (29%) (See Figure 1). In all localities of the three provinces, there were modifying factors such as mowing, trampled, overgrazing and fire tracks which were evident that the species are disturbed/threatened.

Figure 1: Total number of species per province



Discussions

Although the targeted areas for the in-field survey were protected areas, private land and communities, there were CWR species surveyed that occurred along the road sides which were not protected and are of high disturbed areas. The most common trend discovered during the survey is that CWR occurred in the wetland habitats, along the streams. The high occurrences of Imperata cylindrica along the road side and inside private land in Mpumalanga and KwaZulu-Natal indicate its potential for in situ conservation as it's widespread. However, factors such as veld fires, mowing and overgrazing continue to be a threat. Wild rice, Oryza longistaminata, was the only species found to be occurring in one protected area of the same locality recorded more than 30 years back which necessitate immediate conservation both in situ and ex situ. Only in the Limpopo Province local communities were involved in locating the occurrence of Solanum spp, helping to identify CWR awareness gap in other provinces. This information will assist the conservation planner to identify CWR hotspots and prioritise species for conservation purposes.

Photo 1: Solanum lichtensteinii

Photo 2: Specimen pressing

Photo 3: Solanum catombense

Photo 4: Imperata cylindrica

Photo 5: Oryza longistaminata

agriculture, forestry & fisheries
Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

UNIVERSITY OF BIRMINGHAM
Bioversity International
ARC • LNR
SANBI Biodiversity for Life South African National Biodiversity Institute
SADC CROP WILD RELATIVES