Ascension Island Biodiversity Action Plan

SPOROBOLUS CAESPITOSUS

Photo: C. Laine

SUMMARY

Taxonomy: Kingdom: Plantae; Phylum: Tracheophyta; Class: Liliopsida; Order: Cyperales; Family: Gramineae; Species: *Sporobolus caespitosus*

Nativeness: Endemic to Ascension Island

Description: Small, perennial, tuft forming grass found on damp, wind-exposed banks and outcrops around on the upper slopes of Green Mountain. Dead leaves do not decompose easily and often the only living material in a tuft consists of a few leaves and infloresences at the centre, insulated from the wind by dead growth.

IUCN Red List status: Critically Endangered CR

Local trend: Unknown

Threats: The major threat to *S. caespitosus* is competition with invasive plant species; secondary threats include introduced herbivores and climate change-induced habitat alteration.

Citation: Ascension Island Government (2015) *Sporobolus caespitosus* species action plan. In: *The Ascension Island Biodiversity Action Plan*. Ascension Island Government Conservation Department, Georgetown, Ascension Island

DARWIN INITIATIVE

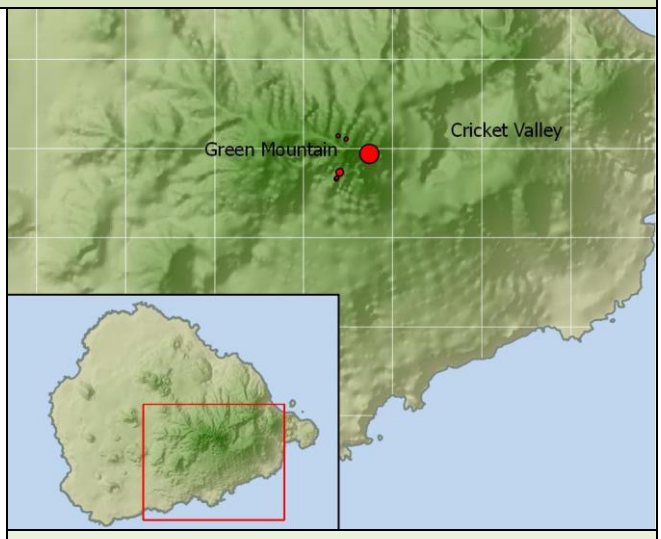
2. Distribution

Global

Sporobolus caespitosus is endemic to Ascension Island.

Local

This species is known only from the central part of Ascension Island. The main part of the population is restricted to sparsely-vegetated banks and rock ledges on the southern and eastern sides of Green Mountain, between 600 and 750 m altitude. Two major population centres remain: one on an exposed, ridge running in a south-easterly direction from the summit of Green Mountain (known locally as Windy Ridge), and a second, smaller cluster on a series of south facing outcrops known as Stedson's Ledge. A small outlying population comprised of approximately 70 individuals is also distributed on the banks above Elliott's Path on the north east side of Green Mountain. Lambdon et al. reported finding a fourth, small population centre on the cliffs of Weather Post, a trachyte dome 2 km to the northeast of Green Mountain, at an altitude of approximately 600m [1]. However, subsequent surveys have not managed to relocate it. All subpopulations are very small and both the extent of occurrence and area of occupancy are likely to be smaller than 1 km².



Distribution of *Sporobolus caespitosus* in March 2014 (AIG Conservation Department, unpublished data). Symbol sizes are scaled according to total numbers of plants encountered [2].

3. Status

Population estimate:	1000 mature individuals	Trend:	Probably Stable	IUCN status:	Critically Endangered

The population of *S. caespitosus* has been monitored annually since 2003. However, these figures include an unknown number of cultivated plants re-introduced to existing sites prior to 2013, meaning it is difficult to disentangle natural population trends from the progress of restoration efforts. The discovery of several new sub-populations between 2009 and 2010 increased the total population from approximately 450 mature individuals to around 700–800, including a "small number" of introduced plants [3]. At the last census in March 2014 there were estimated to be 1,085 mature individuals spread over the two major population centres, including at least 100 re-introduced plants. A few scattered individuals probably remain unaccounted for, but no new large patches are likely to be discovered. It seems likely therefore that the natural population has remained relatively stable over recent years at 700–1000 mature individuals. However, this should be viewed against a backdrop of longer term decline linked to a reduction in the extent and quality of suitable habitat. Many sites that would formerly have provided habitat are now overgrown with introduced weeds and on-going management is needed to prevent them encroaching on the remaining localities, which are almost certainly refugial. Without continuing management, further declines are likely to occur.

4. Ecology

Habitat

In its extant localities, *Sporobolus caespitosus* is found on exposed, relatively bare banks and outcrops between 600 and 750m, always facing into the south-easterly trade winds. As a result, it receives very high levels of moisture from mist and rain, but may also benefit from the low cover of invasive weeds in these extreme habitats. *S. caespitosus* is clearly well adapted to survive in the harsh climate: the foliage grows in dense, sub-spherical tufts, insulated by persistent dead leaves. The flowering spikes are short and remain partly hidden in the leaf tuft, which probably helps to protect them against damage. Wild plants are seldom more than 20 cm in diameter and 10 cm high, although under favourable conditions it can form larger, more luxuriant tussocks up to 40cm in diameter [1,3,2]. Some of the

banks populated by *S. caespitosus* are composed of relatively bare, eroding cinder. However, it reaches higher densities on damper outcrops where it is often associated with a diverse community of bryophytes and with the endemic fern *Stenogrammitis ascensionensis* [1].

Reproduction & life history

S. caespitosus flowers throughout much of the year and produces numerous seedlings [3]. Many of these die in dry conditions, but a reasonable number survive to maturity. Seed dispersal appears to be largely down-wind [1].

Taxonomy & population structure

Sporobolus is a widespread tropical and sub-tropical genus with more than 160 species worldwide [4]. At least twenty nine species have been recorded from tropical west Africa and 28 from Brazil, which are the most likely sources of colonisation [4]. *S. caespitosus* is closely related to the extinct *S. durus* from Ascension Island and shows some morphological similarities to the endemic *S. nesiotioides* from Trindade Island (Brazil), although its true phylogenetic affiliations are not known [4]. No population genetic studies have been completed on Ascension Island, although given the small sizes and proximity of remaining sub-populations, it is not unreasonable to regard all *S. caespitosus* sites on Green Mountain as part of a single meta-population [3].

4. Threats*

8.1.2 Invasive non-native/alien species/diseases (named species)	**Impact:**	HIGH

Sporobolus caespitosus is very vulnerable to encroachment by invasive weed species at its remaining locations. The most serious invaders are grasses such as *Sporobolus africanus* and *Paspalum scrobiculatum*, which form continuous ground cover and thus remove potential germination sites [3]. Broadleaved weeds such as *Clidemia hirta* and *Begonia hirtella* also constitute a significant threat. Without regular management, suitable sites would certainly be lost. Sheep and rabbits will readily graze accessible tufts, and usually kill plants because the weak roots are easily torn-out. Probably for this reason, most plants are on steep ledges and difficult to access [3].

11.1 Climate change & severe weather: Habitat shifting & alteration	**Impact:**	UNKNOWN

Sporobolus caespitosus is currently confined to high altitude, windward-facing banks and outcrops where it receives high levels of moisture from mist and rain. Any drying of the climate as a result of anthropogenic climate change would therefore be expected to have a significant impact on the population. It is difficult to predict changes in rainfall at Ascension Island with any degree of confidence [5]. However, many global climate models suggest that rising temperatures during the 21st century will lead to a reduction in low-level cloudiness and an altitudinal shift in montane ecotones by several hundred metres [6]. Such a shift poses a particular threat to species like *Sporobolus caespitosus* which are already restricted to higher elevations and risk being displaced altogether.

10.3 Avalanches/landslides	**Impact:**	LOW

The few remaining populations of *S. caespitosus* inhabit steep banks and near vertical cliff faces and are therefore vulnerable to catastrophic events such as landslips which occur periodically on the upper slopes of Green Mountain [7]. Indeed, a landslip in 2009 probably destroyed close to 50 individuals. Such disturbance events are also valuable as they create new open habitat areas, but since the existing populations are so small and exposed areas are rapidly colonised by invasive weeds, the net effects are undoubtedly negative as they impact a significant proportion of the population [3].

8.4.1 Problematic species/diseases of unknown origin (unspecified species)	**Impact:**	UNKNOWN

The leaves of the tussocks are often infected with a black, smut-like fungal infection. This is common on other plants in the area and appears to be epiphytic. It is not known whether any damaging effects result [3].

*Threats are classified and scored according to the IUCN-CMP Unified Classification of Direct Threats [8]

Relevant policies and legislation

S. caespitosus is protected under the Wildlife Protection Ordinance 2013, which prohibits the damaging, killing or possession of protected species without license. All populations are contained within Green Mountain National Park designated under the National Protected Areas Order 2014. The National Protected Areas Regulations 2014 restrict

all forms of development within the national park.

Management notes

Significant steps have already been taken in safeguarding *S. caespitosus* from extinction. The species has been grown in cultivation since 2004 and propagation protocols are now well developed. An *ex situ* population is maintained in the Green Mountain Nursery and a seed bank has been established as a conservation failsafe. Substantial numbers of cultivated plants have also been returned to wild populations or planted out into a fenced, cloud-forest clearing close to the summit of Green Mountain which functions as a seed orchard. Specimens planted in the latter often grow more vigorously than in wild situations, but the site has proven difficult to maintain due to the rapid encroachment of invasive weeds. Future restoration efforts would therefore be best focussing on exposed outcrops and banks similar to those that support the remaining wild populations.

Given the precarious situation of *S. caespitosus* in the wild, *ex situ* propagation and restoration will continue to form an important part of the conservation strategy for this species in the short to medium term. Management should initially focus on protecting the small number of existing habitat areas from further damage by invasive species as well as bolstering wild populations with individuals raised from cultivated sources. In the longer term, however, additional habitat areas will undoubtedly need to be found. Reclaiming areas of suitable habitat from introduced weeds will be challenging and is probably best approached as part of a wider programme of habitat restoration aimed at reinstating Green Mountain's native, wet rock plant community [1]. In addition to S. *caespitosus*, this rich community probably once included the endemic ferns *Anogramma ascensionis*, *Asplenium ascensionis* and *Stenogrammitis ascensionense*, along with a diversity of native bryophytes [1]. The creation of zones where several threatened plants can be managed together adds an efficiency of scale and effort to the conservation programme and may confer greater resilience on the resultant community. Nonetheless, the limited competitiveness and functional diversity of the native flora mean that restored areas are likely to remain highly vulnerable to re-invasion without continuous management. Small scale trials over several years will be needed to assess on-going management commitments and explore options for limiting re-invasion. This could include the establishment of dense swards of native vegetation, or the creation of buffer zones planted with non-adventive, exotic species [1].

As with the Island's other endemic flora, the ultimate management goal for *S. caespitosus* must be the establishment of self-sustaining populations that are able to persist without human intervention and with no requirement to re-stock habitats with individuals from cultivated sources. Under present conditions it is difficult to envisage how this can be achieved. The species has already been driven to the verge of extinction by invasive weeds and, unless the original causes of decline are addressed, restored habitats will remain similarly vulnerable to invasion should management ever cease. Nevertheless, careful observation and experimentation may yet reveal conditions under which *S. caespitous* is able to co-exist with introduced species. In this respect, the conservation of this species should be viewed as part of a broader programme aimed at restoring balance to Ascension Island's cloud forest ecosystem. This may involve reducing the competitiveness of particularly aggressive invasive weeds through targeted biological control, exploring the use of benign non-native species to supplement the development of stable, mature communities, and restoring natural disturbance regimes to create opportunities for early successional native and endemic species. Ultimately, the long term survival of the native flora may rely on their ability to integrate into the novel ecosystem that has developed around them. The challenge for conservation will be to identify management measures that can facilitate this outcome.

References

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