Ascension Island Biodiversity Action Plan

STENOGRAMMITIS ASCENSIONENSIS

Photo: M. Nissalo

SUMMARY

Taxonomy: Kingdom: Plantae; Phylum: Tracheophyta; Class: Polypodiopsida; Order: Polypodiales; Family: Polypodiaceae; Species: *Stenogrammitis ascensionensis*

Nativeness: Endemic to Ascension Island

Description: Tiny fern with linear, narrow laminae (fronds) generally less than 5 mm wide and 10 cm long. Grows as a lithophyte on damp, wind-exposed banks and rocks and more commonly as an epiphyte in the manmade cloud forest around the summit of Green Mountain. Often associated with a dense sward of native bryophytes, such as the moss *Calymperes ascensionis.*

IUCN Red List status: Critically Endangered CR

Local trend: Probably stable ↔

Threats: The major threat to *S. ascensionensis* is competition with invasive plant species; secondary threats include climate change-induced habitat alteration and loss of old growth host trees.

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

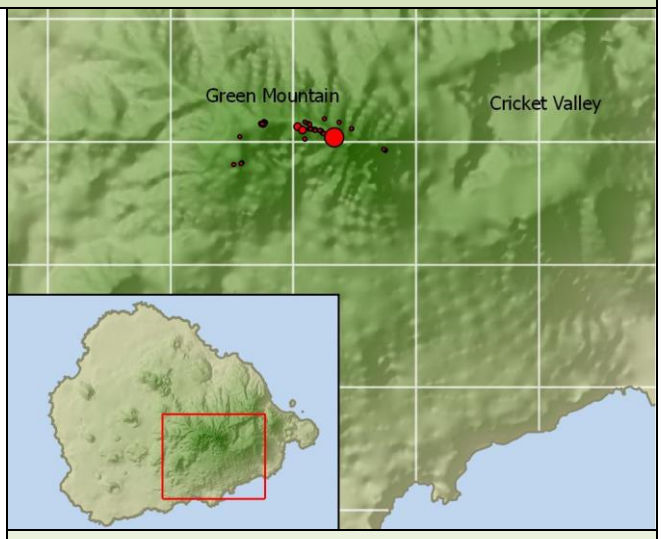
Distribution

Global

Stenogrammitis ascensionensis is endemic to Ascension Island.

Local

S. ascensionensis has an extremely restricted distribution, being limited to small areas of sparsely-vegetated banks on the south, east and north east faces of Green Mountain, and more abundantly as an epiphyte on vegetation near the summit. A satellite epiphytic population has also been established artificially on Coronation Peak, 250 m from the main summit population. All known localities occur between 660 and 860 m altitude. Most subpopulations are very small and both the extent of occurrence and area of occupancy are estimated to be smaller than 1 km2 [1].



Distribution of *Stenogrammitis ascensionensis* in March 2014 (AIG Conservation Department, unpublished data). Symbol sizes are scaled according to total numbers of plants encountered.

3. Status

Population estimate:	Unknown	Trend:	Probably Stable	IUCN status:	Critically Endangered

Obtaining accurate population size estimates for S. *ascensionensis* is practically impossible as the majority of the population is hidden high in the canopy of the manmade cloud forest. Gray et al. report the total population as > 5000 individuals [2], Lambdon et al. estimate that there may be up to 10,000 individuals in total [1] and recent surveys during the 2012-2014 annual plant censuses place the total at 20,000 - 23,000 individuals (AIG Conservation Department, unpublished data). In all cases, counts are highly subjective and should be treated with caution. The population status of S. *ascensionensis* may therefore be best inferred from changes in distribution and the extent of available habitat. The terrestrial portion of the population is now very small and restricted to a few, scattered fragments of suitable bank habitat, having been largely displaced by introduced weeds. The species has only survived in significant numbers by shifting to an epiphytic existence on introduced trees and bamboo, meaning its fate is now tightly coupled to that of its hosts. Given that the extent of the cloud forest habitat has changed very little in recent years, it seems likely that overall numbers of S. *ascensionensis* have remained stable. However, if old growth trees begin to die and are not replaced this situation could change.

4. Ecology

Habitat

Native habitats are damp, wind-exposed rocks and banks on south- and east-facing slopes close to the summit of Green Mountain, where it often co-occurs with the endemic grass *Sporobolus caespitosus* and the characteristic bryophyte community of these habitats. More recently, *S. ascensionensis* has also colonised tree branches and bamboo culms in the manmade cloud forest that now dominates the peak area, often growing amongst dense swards of native bryophytes such as the moss *Calymperes ascensionis*. In all situations, *S. ascensionensis* is restricted to very exposed micro-environments where strong winds deliver much moisture in the form of frequent mists.

Reproduction & life history
S. ascenionensis has green spores which only remain viable for a short period, but appears to disperse reasonably efficiently as subpopulations occur in a number of very small sections of suitable habitat which are physically isolated from each other. Gametophytes apparently require exposed surfaces free from competing vegetation in order to germinate. In the epiphytic part of the population they are only common on very moist sections of exposed bark, often created when a clump of moss turf falls from the tree [3]. These microhabitats are rare and ephemeral, being quickly recolonized by a dense cover of mosses that out compete the gametophytes [3]. *S. ascensionensis* therefore acts as an early successional species of epiphytic bryophyte-dominated communities, dependent on a short-lived and transient ecotone for regeneration.
Taxonomy & population structure
Previously known as *Xiphopteris ascensionensis* but was placed in the new genus *Stenogrammitis* by Labiak [4]. *Stenogrammitis* is a pantropical genus comprised of approximately 25 species distributed across the Neotropics, Africa, Madagascar and a few Pacific Islands [4]. No molecular phylogeny including *S. ascensionensis* has been completed, although it is morphologically similar to other *Stenogrammitis* species, notably *S. oosora* from tropical Africa [1]. Further work is needed to establish the true distinction between the species. It is probably reasonable to regard all *S. ascensionensis* sites on Ascension Island as part of a single meta-population, as all are in reasonably close proximity and probably within the distance travelled by spores to colonise new sites.

4. Threats*

8.1.2 Invasive non-native/alien species/diseases (named species)	**Impact:**	MEDIUM
S. ascensionensis has been largely displaced from its native wet rock and cinder bank habitats by a myriad of introduced grasses (e.g. *Sporobolus capensis* & *Paspalum scrobiculatum*), maidenhair ferns (*Adiantum raddianum* & *Adiantum capillus-veneris*) and broadleaved weeds such as *Clidemia hirta* and *Begonia hirtella* [1,3]. Very little suitable habitat now remains and, where they do still occur, sporophytes inhabiting banks tend to be stunted and lack vigour. The species has probably avoided functional extinction by colonising trees and bamboo culms in the man-made cloud forest where it grows as an epiphyte [3]. However, even in this novel habitat, *S. ascensionensis* is threatened by encroaching weeds such as *Clidemia* and *Begonia* which readily colonise the dense growths of moss that cover many surfaces [3]. Aside from directly competing with *S. ascensionensis*, these invaders may help to stabilize the moss sward and limit the formation of bare, disturbed patches that are needed for gametophyte development [3].		
11.1 Climate change & severe weather: Habitat shifting & alteration	**Impact:**	UNKNOWN
Stenogrammitis ascensionensis only occurs on the mist-drenched, summit slopes of Green Mountain, where frequent immersion in clouds provides the continuously damp environment that it requires. This extreme niche makes it highly vulnerable to the effects anthropogenic climate change. There are growing concerns that rising temperatures during the 21st century will reduce low-level cloudiness and increase the altitude of montane ecotones by hundreds of metres, resulting in the displacement of cloud forest ecosystems from many mountain peaks [5]. Epiphytes like *S. ascensionensis* are particularly susceptible to desiccation and will be among the first species to suffer from a reduction in humidity and mist condensation if the altitude of cloud formation increases as predicted [5].		
12.1 Other threat: loss of old growth trees	**Impact:**	LOW
Although *S. ascensionensis* was originally a colonist of wet rocks and banks, the majority of the world population currently grow as epiphytes on the branches of exotic trees. Many of these old-growth trees were deliberately planted during efforts to forest the summit of Green Mountain during the nineteenth century and natural recruitment appears to be low or absent [1]. Instead, when mature trees fall they are generally replaced by dense thickets of fast-growing shrubs or bamboo which are either inferior or unsuitable as hosts for *S. ascensionensis*. Several large specimens have been lost in recent years on the slopes below the peak area raising concerns of further losses within the range of *S. ascensionensis*. The loss of even a single large tree within this area could destroy a significant proportion of the world population.		

*Threats are classified and scored according to the IUCN-CMP Unified Classification of Direct Threats [6]

Relevant policies and legislation

Local

S. ascensionensis 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

Despite having formed around conspicuously non-native trees, the manmade cloud forest at the summit of Green Mountain now harbours the vast majority of the world population of *S. ascensionenis* and is likely to be critical to the long term survival of the species. Planting new trees to replace ageing specimens and increase the area of epiphytic habitat for S. *ascensionensis* should therefore be regarded as a long-term management priority and may benefit other native species. In the short term, attempts could also be made to expand the range of *S. ascensionenis* into any areas of suitable epiphytic habitat that have not yet been colonised. A small satellite population was successfully established on Coronation Peak by placing branches laden with adult plants into the canopy of a small group of *Pandanus* trees [1] and this approach could be repeated elsewhere. However, similar expansion attempts in more sheltered locations have failed so locations would need to be selected carefully [1].

Given the relatively healthy size of the epiphytic population it is questionable how much should be invested in restoring *S. ascensionensis* in its original, exposed bank habitats. These habitats are increasingly overgrown by vigorous, introduced weeds and restored areas are likely to remain extremely vulnerable to reinvasion without regular management. If restoration is attempted it would be best combined with conservation efforts for other associated endemics, such as the grass *Sporobolus caespitosus* [3], and should be trialled at a small scale so that on-going management commitments can be assessed. Indeed, experiences to date have shown that any gains made are quickly lost when short-term habitat restoration projects end, so management requirements must be sustainable within the core capabilities of the Conservation Department. The only relatively un-invaded, native habitat for *S. ascensionensis* is located within the *Histiopteris incisa – Ptisana purpurascens* fern community above Buddleia Ravine where it colonises rocky outcrops between the denser fern sward. Steep gradients and dense vegetation make working in this area challenging and it will not be practical to manage individual *S. ascensionensis* sites without damaging the fragile habitat surrounding them. However, it may be possible to maintain a perimeter around the existing habitat area to prevent further spread of smothering weeds such as ginger, buddleia and *Clerodendrum*.

Propagation protocols have been developed for cultivating *S. ascensionensis* from spore [7], although permanent living collections are not currently maintained in the Island nursery. Given the relatively healthy status of the population in its remaining strongholds, further *ex situ* conservation is not considered a priority.

References

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