

Vegetation and checklist of Inaccessible Island, central South Atlantic Ocean, with notes on Nightingale Island

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Keywords: Inaccessible Island, Nightingale Island, south Atlantic ocean, vegetation

ABSTRACT

The physiography and climate of Inaccessible and Nightingale Islands are briefly discussed. The vegetation and the major plant associations are described. Notes are given on the ecology and distribution of each taxon. Taxa newly recorded for Inaccessible Island include *Agrostis goughensis*, *A. holgateana*, *A. wacei*, *Calamagrostis deschampsiiiformis*, *Carex thouarsii* var. *recurvata*, *Coryza albida*, *Elaphoglossum campylolepium* and *Uncinia meridensis*. One species, *C. albida*, is alien to the Tristan group. Two native ferns *Asplenium platybasis* var. *subnudum* and *Blechnum australe* were found on Nightingale Island for the first time, and the presence of introduced *Malus domestica* orchards was recorded. Two unidentified taxa were found that may represent new species: *Elaphoglossum* sp. at Inaccessible Island and *Apium* sp. at both Inaccessible and Nightingale Islands.

The total number of vascular plant species recorded at Inaccessible and Nightingale Islands now stands at 98 and 43, respectively, of which 26 (28%) and seven (16%) are introduced species. Only *Atriplex plebeja* and two species of *Cotula* occur at Nightingale Island but are absent from Inaccessible Island.

UITTREKSEL

Die fisiografie, klimaat en plantgemeenskappe van Inaccessible- en Nightingale-eilande, word kortliks beskryf. Inligting oor die ekologie en verspreiding van elke takson word ook verskaf. Agt taksons, *Agrostis goughensis*, *A. holgateana*, *A. wacei*, *Calamagrostis deschampsiiiformis*, *Carex thouarsii* var. *recurvata*, *Coryza albida*, *Elaphoglossum campylolepium* en *Uncinia meridensis* word almal die eerste keer op Inaccessible-eiland aangeteken. *C. albida* is 'n indringer in die Tristan-groep. Nuwe verspreidings vir Nightingale-eiland sluit onder meer die twee varingspesies *Asplenium platybasis* var. *subnudum* en *Blechnum australe* en gevestigde appelboorde, *Malus domestica*, in. Twee ongeïdentifiseerde taksons wat moontlik nuwe spesies mag wees, is versamel: *Elaphoglossum* sp. op Inaccessible-eiland en *Apium* sp. op beide Inaccessible- en Nightingale-eilande.

Die totale aantal vaatplantspesies wat op Inaccessible- en Nightingale-eilande aangeteken is, staan nou onderskeidelik op 98 en 43, waarvan 26 (28%) en sewe (16%) indringers is. *Atriplex plebeja* en twee *Cotula*-spesies is die enigste plante wat op Nightingale-eiland voorkom maar van Inaccessible-eiland afwesig is.

INTRODUCTION

Inaccessible and Nightingale Islands are uninhabited islands in the Tristan da Cunha group, central South Atlantic Ocean. Situated at 37°S, they are among the temperate oceanic islands least disturbed by human activities (Wace & Holdgate 1976). Several botanical collections have been made on the islands despite the hazardous landing conditions, but most collections were scant, resulting from short visits only (Groves 1981). The most recent floristic account of the floras at Inaccessible and Nightingale Islands is that of Wace & Dickson (1965). We provide a more complete and up-to-date account of the vegetation of the two islands as a result of a summer-long stay on Inaccessible Island between October 1989 and March 1990. Nightingale Island was visited on one day in October, two days in November and one day in December.

GEOLOGY, PHYSIOGRAPHY AND CLIMATE

Inaccessible and Nightingale Islands are of volcanic origin, associated with the Mid-Atlantic Ridge. Bathy-

metric surveys of the coastal waters suggest that the islands are remnants of once much larger islands (Baker *et al.* 1964). Lavas from Inaccessible Island have been dated at approximately three million years old, whereas Nightingale Island originated approximately 18 million years ago (Gass 1967; McDougall & Ollier 1982). The geology of the islands has been described by Baker *et al.* (1964). Inaccessible Island consists of thin basaltic lava flows interbedded with ash and cinders, with intrusive trachyte dykes, plugs and domes. Nightingale Island, being older, is more extensively eroded, and consists almost entirely of trachytes.

Inaccessible Island has a planar area of approximately 12 km² (Preece *et al.* 1986, *contra* Siddall 1985). It is surrounded by sheer cliffs which are 500 m high in the west and 200 m in the east (Figure 1). The plateau is undulating, with three main drainage basins and a few small hills, the highest being Swale's Fell, 511 m (Figure 2). Nightingale Island has a planar area of approximately 3 km² and is lower-lying than Inaccessible Island, the highest peak being approximately 370 m (Wace & Holdgate 1976). There are no permanent streams on Nightingale, but there are three bogs (The Ponds) in the central part of the island (Figure 3).

The climate of Inaccessible and Nightingale Islands is cool temperate oceanic (Wace & Holdgate 1976). There are few meteorological observations from the islands, but

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FIGURE 1. —A view of Inaccessible Island from the north. The island is characterised by its steep cliffs.

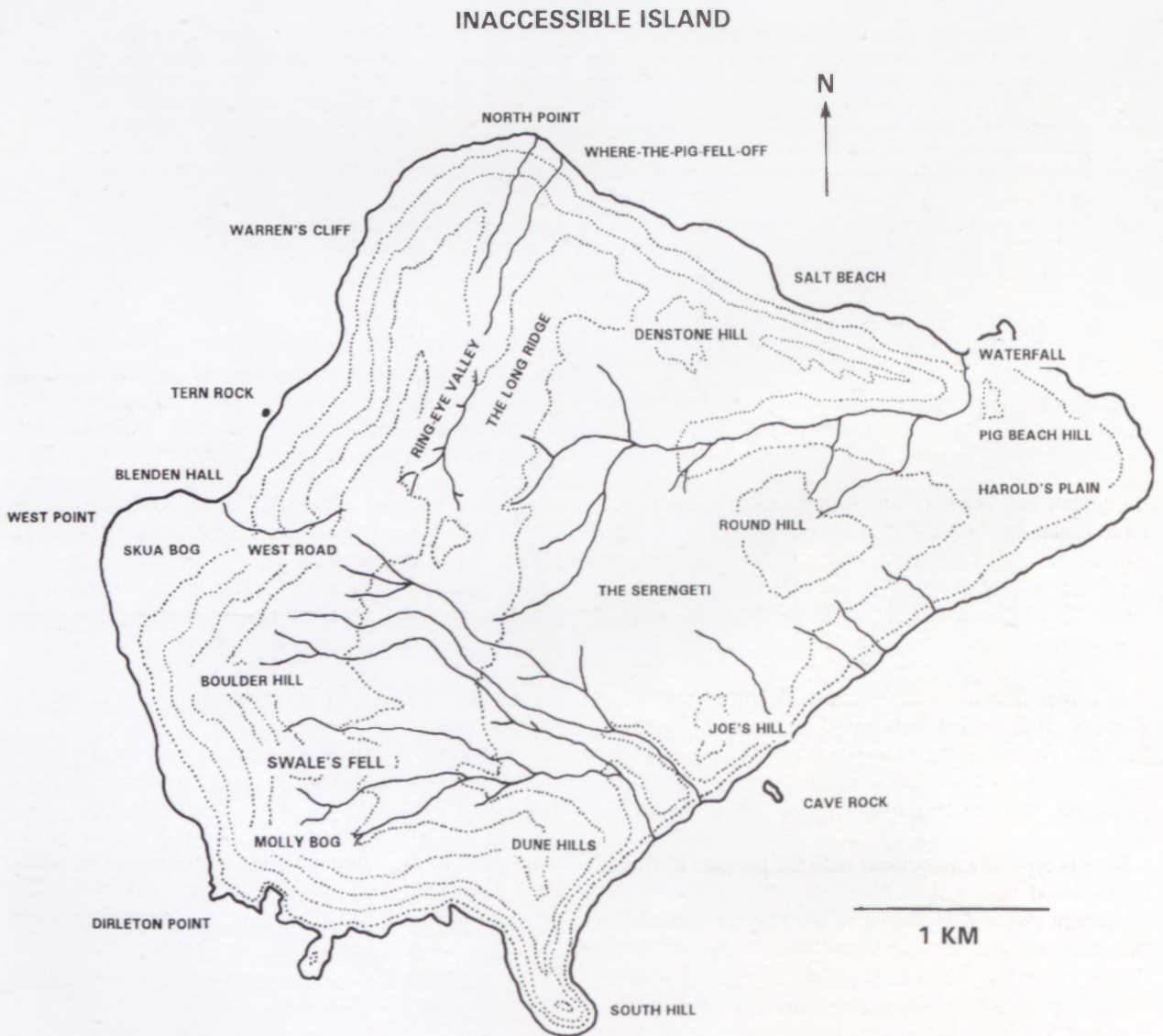


FIGURE 2. —Map of Inaccessible Island showing the major collecting sites. (Adapted from Fraser *et al.* 1983.).



FIGURE 3.—Map of Nightingale Island showing the major collecting sites. (Adapted from Groves 1981).

the climate near sea level is probably similar to that recorded at Tristan da Cunha, 40 km away (see Wace & Holdgate 1976). Mean daily minimum and maximum temperatures measured during October 1989 and December to March 1989–90 at Blenden Hall, ± 10 m above sea level at Inaccessible Island, were 14.0°C and 21.6°C (range $7.5\text{--}28^{\circ}\text{C}$). Temperatures on the plateau are considerably cooler than those at the coast. Relative humidity at Blenden Hall varied between 52% and 100% (mean 82.5%). The prevailing winds are from the west, and there is often a marked altitudinal variation in wind strength; winds are stronger on the plateau than along the coast.

Rain is typically associated with the passage of frontal systems and occurs throughout the year, with a winter maximum (Wace & Holdgate 1976). The mean rainfall at Blenden Hall, Inaccessible Island was 151 mm per month during summer, with at least some rain on 73% of days. Rainfall on the plateau was approximately one-third higher than that recorded near sea level, and precipitation on the plateau is higher still due to the frequent formation of orographic clouds (typically above 350m). Orographic cloud covered the top of Inaccessible Island on 50.4% of

days during summer 1989–90. Nightingale Island, 22 km distant from Inaccessible Island, presumably has a similar climate to that at Inaccessible. However, being a lower island, Nightingale has less marked altitudinal variation in climate, and has orographic cloud cover less frequently than does Inaccessible Island.

VEGETATION

The origin of the floras of isolated, geologically young islands by means of long distance dispersal has been discussed extensively (e.g. Tryon 1966; Carlquist 1980; Huntley 1967; Wace 1960). The main dispersal vectors of propagules to the Tristan islands are transport by wind, birds and ocean currents (Wace & Dickson 1965). The origin of the Tristan flora is primarily South American or southern circumpolar (Wace & Dickson 1965; Tryon 1966). Preece *et al.* (1986) discuss the Quaternary paleobotany of Inaccessible Island.

The vegetation types of the various islands in the Tristan group are broadly similar, and we have adopted the terminology used by Wace & Holdgate (1958) and Wace

& Dickson (1965). We recognize four physiognomically distinct types of vegetation or formations (Figures 4 & 5), which can be divided into several communities characterised by different dominant species. The communities are used as a unit of description and can be grouped in their formations as follows: 1, tussock grassland: *Spartina arundinacea* tussock; *Blechnum penna-marina* heath. 2, fern bush: *Blechnum palmiforme* heath; *Phylica arborea* bush. 3, wet heath. 4, bogs: *Sphagnum* bog; *Scirpus sulcatus* bog.

Tussock grassland

Tussock grassland covers most of Nightingale Island and occurs along the steep cliffs from sea level to ± 500 m on Inaccessible Island. The formation consists of large *Spartina arundinacea* tussocks which are up to 3.5 m tall. On drier, more exposed ridges *S. arundinacea* tussock is replaced by *Blechnum penna-marina* heath on the west coast of Inaccessible Island.

Spartina arundinacea tussock

On Inaccessible Island this community forms extensive stands on the small areas of flat ground at sea level and on all the steep sea-facing cliffs up to ± 500 m (Figure 6). It penetrates the plateau only in the low-lying river valleys above the Waterfall and Cave Rock. In areas of tall, dense growth, the closely spaced tussocks exclude all other vascular plants.

On drier, better drained ridges and in marshy areas the tussocks are more widely spaced, allowing multi-species communities to form. The species more commonly found on ridges and slopes include *Blechnum australe*, *B. penna-marina*, *Elaphoglossum laurifolium*, *E. succisifolium*, *Rumohra adiantiformis*, *Empetrum rubrum* and *Nertera depressa*. In marshy areas *Amauropelta bergiana* var. *tristanensis*, *Carex insularis*, *Mariscus congestus*, *Holcus*

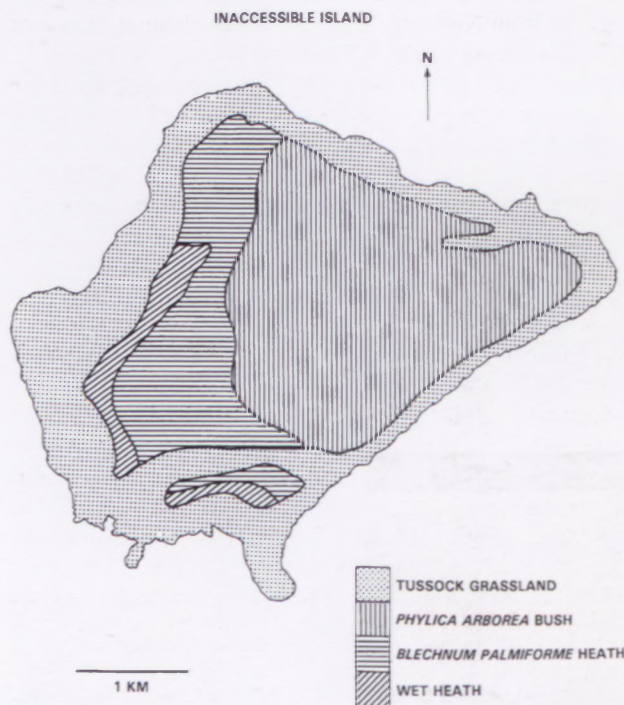


FIGURE 4. — Map of Inaccessible Island showing the distribution of the major vegetation types.

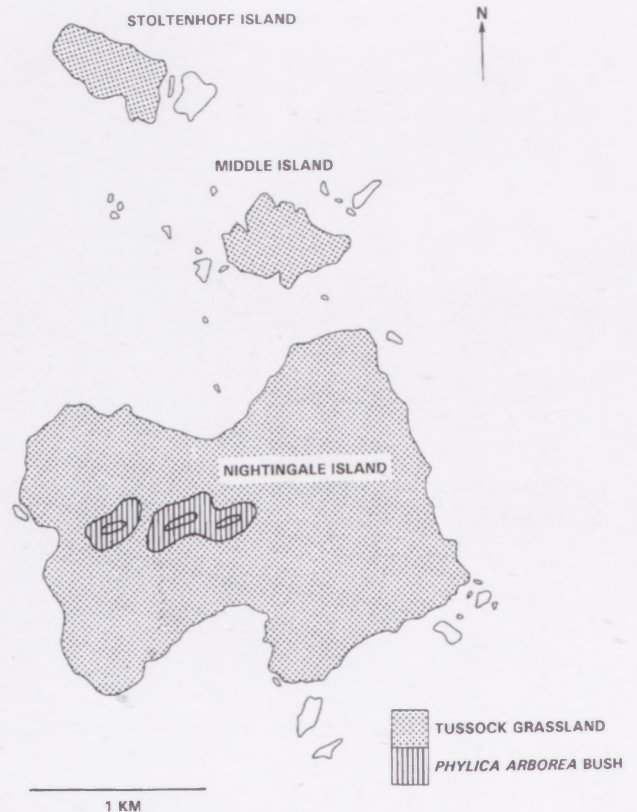


FIGURE 5. — Map of Nightingale Island showing the distribution of the major vegetation types.

lanatus, *Hydrocotyle capitata*, *Rumex frutescens* and *Scirpus sulcatus* var. *sulcatus* are commonly found. *Calystegia sepium* subsp. *americana* and *C. tuguriorum* climb over *Spartina* tussock in some areas.

Small streams and seepages run down the steep slopes onto the boulder beaches with *Azolla filiculoides*, *Plantago major* and *Rumex obtusifolius* subsp. *obtusifolius* commonly occurring on the streambanks. *Apium australe* and *Sonchus oleraceus* are common on the eroded talus slopes above the beach between Dirleton Point and Warren's Cliff. Rockhopper penguins (*Eudyptes chryso- come*) erode paths in their colonies under the tussock, resulting in some tussocks standing on a root pillar up to 300 mm high.

Soil slips are common on the steep coastal scarps and alien species are among the first plants to become established. Introduced species recorded on slips on Inaccessible Island include *Conyza albida*, *Holcus lanatus*, *Pseudognaphalium luteo-album*, *Plantago major*, *Sonchus oleraceus* and *Veronica serpyllifolia*, whereas *Apium australe*, *Pelargonium grossularioides*, *Scirpus bicolor* var. *virens* and various mosses are native species that colonize slips.

On Nightingale Island *Spartina arundinacea* tussock extends over most of the island. The tussock bases are more widely spaced, with the open areas between tussocks extensively burrowed into by great shearwaters (*Puffinus gravis*) for nests. Species more commonly found among the tussock include *Hypolepis rugosula* var. *villosa-viscida*, *Histiopteris incisa* var. *carmichaeliana* and *Scirpus bicolor* var. *bicolor*. *Asplenium obtusatum* var. *crassum* and *A. platybasis* var. *subnudum* were found less commonly.



FIGURE 6.—Tussock grassland: *Spartina arundinacea* on the low-lying plain at West Point, Inaccessible Island.

Disturbed open areas, especially along the path between the huts and the Ponds, have largely been taken over by introduced species such as *Holcus lanatus*, *Poa annua*, *Rumex obtusifolius* and *Sonchus oleraceus*. Native species found here are *Apium* sp., *Cotula australis*, *C. moseleyi* and *Scirpus bicolor* var. *bicolor*.

Blechnum penna-marina heath

This community is largely confined to well-drained ridges and steep slopes within tussock grassland on the west-facing coastal scarp of Inaccessible Island. *Blechnum penna-marina* generally is dominant, but species such as *Blechnum australe*, *Elaphoglossum succisifolium*, *E. laurifolium*, *Lycopodium diaphanum*, *Acaena sarmentosa*, *Empetrum rubrum*, *Holcus lanatus*, *Nertera depressa*, *Uncinia brevicaulis*, *Vulpia bromoides* and various mosses also occur. *S. arundinacea* and *Ctenitis aquilina* are commonly associated with boulder strewn streambeds, gullies

and cliff bases. This association does not occur on Nightingale Island, where *Blechnum penna-marina* is scarce.

Fern bush

This formation covers most of the plateau on Inaccessible Island, but is restricted to the region around the Ponds at Nightingale Island. Two major associations can be identified.

Blechnum palmiforme heath

This association covers much of the high, western half of the plateau on Inaccessible Island (Figures 4 & 7). It extends from ± 250 m to the highest part of the island at Swale's Fell. Typical *Blechnum palmiforme* heath is absent from Nightingale Island, although small stands of *B. palmiforme* occur at First and Second Ponds.



FIGURE 7.—Fern bush: *Blechnum palmiforme* heath on the plateau, Inaccessible Island. *B. palmiforme* and *Phyllica arborea* are dominant in this community. The stunted growth of the plants may be ascribed to the prevailing westerly wind.

Blechnum palmiforme is the dominant species and the procumbent caudices form a confused tangle with only the apical part turning upwards, bearing a crown of coriaceous fronds 200–400 mm above the ground. Several species of these ferns (e.g. *Elaphoglossum hybridum*, *E. laurifolium*, *E. succisifolium*, *Grammitis magellanicum* subsp. *magellanicum*, *Hymenophyllum aeruginosum*, *H. peltatum*, *Lagenophora nudicaulis*, *Nertera assurgens* and *N. depressa*) are epiphytic on the caudices. *Eriosorus cheilanthoides*, *Huperzia insularis*, *Lycopodium diaphanum*, *Apium australe*, *Calamagrostis deschampsiiiformis*, *Carex thouarsii*, *Scirpus bicolor* var. *bicolor* and *Uncinia meridensis* are frequent non-epiphytes in this association. Watercourses support a number of other taxa including *Callitriche christensenii*, *Glyceria insularis*, *Scirpus sulcatus* var. *sulcatus*, and the introduced species *Holcus lanatus* and *Rumex obtusifolius*. Stunted, procumbent *Phylica arborea* scrub occurs on some slopes and ridges. These plants never flower and usually adopt the height of the surrounding vegetation as a result of the exposed, wind-swept habitat.

Phylica arborea bush

This association is largely confined to the more sheltered eastern part of Inaccessible Island at elevations of \pm 150–250 m. Moving from *B. palmiforme* heath, the initially procumbent *Phylica arborea* scrub becomes progressively taller, until it eventually forms a closed canopy up to 5 m high in well sheltered localities (Figure 8). *P. arborea*



FIGURE 8. — Fern bush: *Phylica arborea* bush on the plateau, Inaccessible Island. In sheltered localities the trees may attain a height of up to 5 m.

branches support dense growths of epiphytic lichens and some ferns such as *Hymenophyllum aeruginosum*. The undergrowth consists largely of dense stands of pteridophytes with *Blechnum palmiforme*, *Ctenitis aquilina* and *Histiopteris incisa* var. *carmichaeliana* the dominant species, although *Elaphoglossum laurifolium* and *Asplenium obtusatum* var. *crassum* form monospecific stands in places. In some areas with dense canopy cover, there is little understorey vegetation, and the ground is extensively burrowed by breeding great shearwaters.

The Serengeti, a flat, relatively dry region in the centre of Inaccessible Island, consists of open *P. arborea* woodland. *B. palmiforme*, which attains a height of up to 2 m, forms a subcanopy between the trees. The ground storey is sparse, with *Eriosorus cheilanthoides*, *Carex thouarsii* var. *thouarsii*, *Empetrum rubrum*, *Nertera depressa*, *Scirpus bicolor* var. *bicolor* and various mosses the most abundant species. Several taxa are very scarce or absent in this area including all grasses, *Acaena sarmentosa*, *Ctenitis aquilina*, *Lagenophora nudicaulis* and *Gnaphalium thouarsii*.

Phylica arborea trees also occur in tussock grassland on the coastal slopes of Inaccessible Island, and are absent only between Dirleton Point and South Hill. Trees occur singly, in small groups, and occasionally in larger groups with closed canopies (such as Wilkins' Copse, east of Skua Bog at the West Point of Inaccessible Island). These trees differ markedly from those on the island plateau. There are very few epiphytic lichens on the branches (presumably due to the infrequency of precipitation from mist and clouds at lower altitudes) and the understorey consists either mainly of *Spartina arundinacea* or has a composition similar to *Blechnum penna-marina* heath.

On Nightingale Island, closed-canopy *Phylica arborea* bush is confined to the vicinity of The Ponds. In damp areas the undergrowth consists largely of *Blechnum palmiforme* and *Scirpus bicolor* var. *bicolor*, but the drier slopes support *Ctenitis aquilina*, *Hypolepis rugosula* var. *villosa-viscida*, *Histiopteris incisa* var. *carmichaeliana*, *Carex thouarsii* var. *thouarsii* and *Acaena sarmentosa*. Scattered *P. arborea* also occurs in tussock grassland, particularly along drainage lines on the eastern peak. In open areas around the Ponds, *Scirpus bicolor* var. *bicolor* forms dominant stands or hummocky meadows. Each tussock has a pachycaul habit.

Wet heath

Wet heath is restricted to the highest part of Inaccessible Island, in a narrow strip along the western edge of the plateau. It is absent from Nightingale Island. Occurring on the highest part of Inaccessible Island, it is exposed to very strong winds, and the vegetation is dense and low-growing (typically 200–300 mm). The formation is geographically limited, and could be considered to be a transitional form between tussock grassland and *B. palmiforme* heath. However, it has several characteristic species, and the large number of breeding birds concentrated in this vegetation type result in a very different proportional composition of the vegetation.

The main community extends along the western rim of the plateau between Swale's Fell and the upper part of Ringeye Valley. This is a diverse community, and the

following species are common: *Amauropelta bergiana* var. *tristanensis*, *Ctenitis aquilina*, *Elaphoglossum succisifolium*, *Hypolepis rugosula* var. *villosa-viscida*, *Acaena sarmentosa*, *Apium australe*, *Carex insularis*, *C. thouarsii* var. *thouarsii*, *Holcus lanatus*, *Hydrocotyle capitata*, *Nertera assurgens*, *Scirpus bicolor* var. *bicolor*, *S. sulcatus* var. *sulcatus*, *Spartina arundinacea*, *Uncinia brevicaulis* and *U. meridensis*. This is the only area where *Glyceria insularis* is found away from watercourses, and *Cardamine glacialis*, *Deschampsia mejlandii* and *Ranunculus mauricatus* occur nowhere else on Inaccessible Island. Disturbed areas in the immediate vicinity of albatross nests and petrel burrows are colonised by invasive species such as the introduced *Cerastium fontanum*, *Holcus lanatus*, *Poa annua* and *Rumex obtusifolius*, as well as native species such as *Gnaphalium thouarsii*.

Southeast of Swale's Fell and in the northern part of Ringeye Valley, typical wet heath is absent, and tussock grassland merges almost directly into *Blechnum palmiforme* heath. However, there is a peculiar mixture of the two formations at Dune Hills, with sparse *Spartina arundinacea* growing in amongst *B. palmiforme* heath. Farther northwest, towards Molly Bog, *S. arundinacea* is replaced by abundant tussocks of *Calamagrostis deschampsiiiformis*.

Exposed rocks and cliffs provide a microhabitat utilised by several species. Species characteristic of damp, shaded crevices include *Asplenium erectum*, *Elaphoglossum obtusatum*, *Grammitis magellanica* subsp. *magellanica*, *Agrostis* sp., *Lagenophora nudicaulis*, *Nertera depressa* and *Uncinia compacta*, whereas sunny, north and west-facing cliffs support species such as *Asplenium obtusatum* var. *crassum* and *Chenopodium ambrosioides* var. *tomentosum*.

Bogs

We consider bogs as vegetated areas with impeded drainage. Two bogs with differing vegetation types are recognised.

Sphagnum bog

There are several relatively small bogs dominated by the moss *Sphagnum* sp. on the eastern part of the plateau on Inaccessible Island. Most are located at the head of small streams. Dick's Bog in Ringeye Valley has been described in detail by Preece *et al.* (1986). Associated species are *Histiopteris incisa* var. *carmichaeliana*, *Carex insularis*, *C. thouarsii*, *Scirpus sulcatus* var. *sulcatus* and *Spartina arundinacea*. This type of bog is not found on Nightingale Island.

Scirpus sulcatus bog

Skua Bog, at West Point, Inaccessible Island, is an extensive marshy area at approximately sea level, dominated by *Scirpus sulcatus* var. *sulcatus* with a small area of open water along the coastal edge (Preece *et al.* 1986) (Figure 9). *Azolla filiculoides*, *Carex insularis*, *Holcus lanatus* and *Rumex frutescens* are the only other species growing in the bog, which is surrounded by tussock grassland. A smaller patch of bog occurs behind the beach to the west of Blenden Hall, which is invaded by the alien species *Mariscus congestus* and *Plantago major*.

Small patches of *Scirpus sulcatus* bog are also found in watercourses on the plateau at Inaccessible Island (e.g. Molly Bog). These bogs are often invaded by *Holcus lanatus*, and may support some *Carex insularis* and *C. thouarsii* var. *thouarsii*. Many bogs on the plateau are associated with breeding white-chinned petrels (*Procellaria aequinoctialis conspicillata*). This species only breeds in wet areas on the plateau of Inaccessible Island, and their burrows are characterised by entrance moats. The mud and water around the burrow entrance support *Hypolepis rugosula* var. *villosa-viscida*, *Callitriche christensenii* and *Scirpus bicolor* var. *bicolor*. In some areas, large numbers of white-chinned petrels breed together at the upslope edge of a bog, and there is a specific pattern of bog colonization. Immediately in front of the nests is an area of open water and bare mud, and at some distance from the focus of bird disturbance this is colonized by



FIGURE 9.—Bogs: *Scirpus sulcatus* bog. Skua Bog at West Point, Inaccessible Island, dominated by *Scirpus sulcatus* var. *sulcatus*.



FIGURE 10.—First Pond, Nightingale Island. Vegetation in this bog consists of an outer zone dominated by *Scirpus sulcatus* var. *sulcatus* followed by a zone of *Blechnum palmiforme*. The central part of the bog is dominated by *Phyllica arborea*. The nesting bird is a yellow-nosed albatross, *Diomedea chlororhynchos*.

Callitriche christensenii. Still farther from the nests, there is the usual stand of *Scirpus sulcatus* var. *sulcatus*.

The Ponds on Nightingale Island also support floating mats of *Scirpus sulcatus* var. *sulcatus*, with little open water (Figure 10). *Carex insularis* and *C. thouarsii* also occur, and *Callitriche christensenii* is found in the shallow water along the edge of The Ponds.

DISCUSSION AND CONCLUSIONS

Seven species and one variety were recorded new from Inaccessible Island, whereas two species were found to be new for Nightingale Island. These figures exclude two taxa that may prove to be new species (*Apium* sp. and *Elaphoglossum* sp.). Our observations bring the total

TABLE 1.—Numbers of species of vascular plants on Inaccessible and Nightingale Islands. Endemic species are those entirely restricted to the Tristan-Gough group of islands, and does not include endemic varieties or subspecies

	Number of species			Total
	Endemic	Native	Alien	
Inaccessible Island				
Pteridophytes	12	16	0	28
Gymnospermae	0	0	1	1
Dicotyledons	6	15	16*	37*
Monocotyledons	14	6	9	29
Total	31	37	26*	94*
Nightingale Island				
Pteridophytes	7	11	0	18
Gymnospermae	0	0	0	0
Dicotyledons	5	6	4	15
Monocotyledons	4	3	3	10
Total	16	20	7	43
Both islands combined	34	37	27	98

* includes two species which may be extinct (*Raphanus sativus* and *Physalis peruviana*), but excludes *Centella asiatica*, for which there is no collected material.

number of species recorded from the islands to 98 and 43 for Inaccessible and Nightingale, respectively (Table 1). Only three taxa are found on Nightingale that are absent from Inaccessible, the two species of *Cotula* (one endemic and one introduced) and the endemic *Atriplex plebeja*. A total of 28 introduced vascular plants occur on the islands, all spermatophytes. The proportion of alien plants is greater on Inaccessible Island (27.7%) than on Nightingale Island (16.3%).

The current survey increased the known species richness at the two islands by almost 10% (cf. Groves 1981). Only one new taxon was an introduced species (*Coryza albida* on Inaccessible Island), suggesting that the rate of transfer from the adjacent inhabited island of Tristan is relatively low. Tristan has more than 100 introduced species (Groves 1981). The low proportion of new introduced species also indicates that further collecting of the native flora is warranted, and that the number of vascular plants probably is larger than that reported here. Some taxa require systematic review, notably *Nertera*, *Uncinia*, some of the grasses (*Agrostis*, *Calamagrostis* and *Deschampsia*), and some of the ferns (*Elaphoglossum* and *Asplenium*).

ACKNOWLEDGEMENTS

We thank the Administrator, Island Council and people of Tristan for permission to work on the Tristan Islands, and for their friendship and support. We are grateful to Dr H.P. Linder for identifying the grasses and to Mr A. Nicholas (South African Botanical Liaison Officer at Kew) for verifying several Dean and Ryan collections and for providing literature not available in South Africa. Our visit to the Tristan group was supported by the South African Department of Environment Affairs through the South African Committee for Antarctic Research, the South African Nature Foundation, and the Wildlife Society of Southern Africa.

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SPECIES ACCOUNT

The following accounts briefly describe the status, distribution and ecology of the vascular plants recorded from Inaccessible and Nightingale Islands. All comments refer to Inaccessible Island, unless otherwise stated. Alien species are marked with asterisks, unrecorded, incorrect species/names with a dagger and the distribution within the Tristan/Gough Islands is denoted by the initial letters of island names (G = Gough, I = Inaccessible, N = Nightingale, and T = Tristan). Author abbreviations follow Stafleu & Cowan (1976–1988). The taxa are arranged alphabetically.

PTERIDOPHYTA

ADIANTACEAE

Adiantoideae

Adiantum poiretii Wikstr.: 443 (1825).

Rare at Inaccessible Island, where it was found at only one site, growing as a lithophyte on exposed north-facing cliffs at an elevation of \pm 300 m.

Distribution: G, I, N, T. *Roux* 2094, 2184 (NBG).

Eriosorus cheilanthoides (Swartz) A.F. Tryon: 271 (1966).

Grammitis cheilanthoides Swartz: 23, 219 (1806).

Fairly abundant on the upper slopes and plateau, chiefly above 250 m. It occurs primarily in fairly sheltered microhabitats in fern bush and wet heath. It is particularly abundant between decumbent *Blechnum palmiforme* caudices and in moss beds among *Phylica* scrub.

Distribution: G, I, T. *Dean* 832 (BOL); *Roux* 2122, 2137, 2162, 2218 (NBG).

Vittaria vittarioides (Thouars) C. Chr.: 655 (1905).

Pteris vittarioides Thouars: 31 (1808).

Common above 200 m on the plateau and upper slopes of Inaccessible Island. It is widespread in wet heath and *B. palmiforme* heath, and is locally common in *Phylica* woodland, but is absent from the Serengeti. It also occurs in exposed conditions as a lithophyte on rock outcrops or low cliffs. In deeply shaded and sheltered conditions the fronds may be pendulous, whereas in exposed habitats they are erect.

Distribution: endemic, G, I, N, T. *Dean* 817, 858 (BOL); *Roux* 2117, 2139, 2161, 2172, 2192, 2200 (NBG).

ASPLENIACEAE

Asplenoideae

Asplenium alvarazense R.N.R. Brown: 247 (1905).

Uncommon, distributed sparsely above 300 m on moist soil slopes shaded by dense stands of *Ctenitis aquilina*.

Distribution: endemic, G, I, T. *Roux* 2157, 2163 (NBG).

A. erectum Bory ex Willd.: 328 (1810).

Fairly common at all altitudes, growing on shaded rocks or under other vegetation including *Spartina* tussock and fern communities, but is never dominant.

Distribution: G, I, N, T. *Dean* 828 (BOL); *Roux* 2096, 2158, 2178, 2191, 2211 (NBG).

A. obtusatum G. Forster var. *crassum* (Thouars) C. Chr.: 12 (1937).

A. crassum Thouars: 33 (1808).

Common at all altitudes, frequently growing on exposed cliffs. Also occurs on flat ground, in moist conditions among boulders near sea level, but is more widespread on the plateau. In *Phylica* woodland plants form clusters up to 1.2 m in diameter. It is apparently fairly resistant to trampling, occurring with *Scirpus bicolor* at albatross loafing sites.

Distribution: endemic var., G, I, N, T. *Dean* 777 (BOL); *Roux* 2054, 2107, 2125, 2141, 2154, 2177, 2194, 2204 (NBG).

A. platybasis Kunze ex Mett. var. *subnudum* C. Chr.: 15 (1940).

Fairly common above 250 m, generally in exposed conditions among grasses and sedges in wet heath, but also under *Phylica* woodland. It was found among *Spartina* tussocks on Nightingale Island for the first time.

Distribution: endemic var., I, N. *Dean* 831 (BOL); *Roux* 2108, 2142, 2150, 2160, 2174, 2199 (NBG).

Athryoideae

Athyrium medium (Carm.) Moore: 186 (1857).

Aspidium medium Carm.: 511 (1818).

Fairly common on the plateau, primarily above 200 m, but down to 100 m along the river above Waterfall Beach. It grows in wet, fairly sheltered conditions on streambanks, cliffs and amongst other ferns in fern bush and wet heath vegetation.

Distribution: endemic, I, T. *Roux* 2119, 2155 (NBG); *Ryan* 127 (NBG).

Dryopteridoideae

Ctenitis aquilina (Thouars) Pic. Serm.: 468 (1973).

Polypodium aquilinum Thouars: 32 (1808).

It occurs at all altitudes, but at lower elevations it is largely restricted to watercourses and boulder fields at the base of cliffs. Abundant over much of the plateau, where plants are stunted in wet heath and *Blechnum palmiforme* heath compared to those at lower altitudes. It often forms extensive dominant stands under *Phylica* woodland, but is absent from the Serengeti.

Distribution: endemic, G, I, N, T. *Dean* 810 (BOL); *Roux* 2092, 2147, 2193 (NBG).

Elaphoglossoideae

Elaphoglossum campylolepium J.P. Roux: 234 (1991).

The species is evidently restricted to higher elevations and on Inaccessible Island it is known from \pm 450 m. It often grows in association with *E. succisifolium* in exposed or sheltered conditions.

Distribution: endemic, I, T. *Roux 2114, 2132* (NBG).

E. hybridum (Bory) Brack.: 69 (1854).

Acrostichum hybridum Bory: 95 (1811).

Fairly common in fern bush above 200 m, growing primarily on *Blechnum palmiforme* caudices, but also on cliffs and rock overhangs.

Distribution: G, I, T. *Dean 835* (BOL); *Roux 2099, 2105, 2140, 2146, 2148* (NBG).

E. laurifolium (Thouars) Moore: 14 (1857).

Acrostichum laurifolium Thouars: 31 (1808).

Like *E. succisifolium*, this species is common at all altitudes and is present in all vegetation types. It prefers more sheltered habitats than *E. succisifolium*. It often forms dense monospecific stands in *Phyllica* woodland with fronds attaining a length of 400 mm.

An apparently undescribed *Elaphoglossum* species occurs on Inaccessible Island. It is distinguished from *E. laurifolium* by its narrower, less robust fronds, the somewhat elevated midrib on the adaxial surface, and the stellate scales on the abaxial surface. It is patchily distributed on the plateau between 200–400 m, where it forms large dominant stands on exposed ridges and streambanks. Few fertile fronds were found throughout the summer.

Distribution: endemic, G, I, N, T. *Dean 801, 875* (BOL); *Roux 2072, 2090, 2144, 2179, 2195, 2205* (NBG).

E. obtusatum (Carm.) C. Chr.: 20 (1940).

Acrostichum obtusatum Carm.: 510 (1818).

Scarce, restricted to the western plateau and upper slopes above 350 m, where it grows in overhangs and on shaded boulders and cliffs.

Distribution: endemic, I, T. *Roux 2107, 2125, 2154* (NBG).

E. succisifolium (Thouars) Moore: 15 (1857).

Acrostichum succisifolium Thouars: 31 (1808). (as *succisaefolium*).

Abundant at all altitudes and present in all vegetation types. It occurs as a geophyte in deep moss in gullies, on exposed cliffs and rocks and as an epiphyte on caudices of *Blechnum palmiforme*.

Distribution: endemic, G, I, N, T. *Dean 800* (BOL); *Roux 2069, 2073, 2143, 2164, 2196, 2206* (NBG).

AZOLLACEAE

Azolla filiculoides Lam.: 343 (1783).

Common on floating *Scirpus sulcatus* in Skua Bog, and also occurs in two smaller bogs towards Blenden Hall. Elsewhere it is restricted to permanent seepages on cliffs and slips above the beach between Dirleton Point and North Point.

Distribution: I. *Dean 776* (BOL); *Roux 2058, 2065* (NBG).

BLECHNACEAE

Blechnum australe L.: 130 (1767).

Virtually restricted to the coastal slopes, where it occurs sporadically up to 350 m, although mostly below 200 m. It is scarce in the valley above the Waterfall. It is common in slightly shaded areas among *Spartina* tussocks and in association with *Blechnum penna-marina*. It also grows in more exposed conditions in crevices among boulders, and occasionally on cliffs. *B. australe* was collected for the first time at Nightingale Island.

Distribution: G, I, N, T. *Dean 798* (BOL); *Roux 2059, 2185, 2190* (NBG).

B. palmiforme (Thouars) C. Chr.: 10 (1940).

Pteris palmiformis Thouars: 30 (1808).

Occurs at all altitudes, and is the dominant plant on much of the plateau. On the high western plateau the caudices are procumbent, forming a

confused tangle (evocatively described by Carmichael 1818), whereas in *Phyllica* woodland, where the plants are more protected, the caudices may reach a height of up to 2 m. The species is scarce on the coastal slopes, occurring in small numbers on ridges.

Distribution: endemic, G, I, N, T. *Roux 2070, 2111, 2189* (NBG).

B. penna-marina (Poir.) Kuhn: 92 (1868).

Polypodium penna-marina Poir.: 520 (1811).

Common at all altitudes, often forming extensive dominant stands on exposed ridges on the coastal slopes in the west. It is seldom dominant on the plateau, but is widespread, occurring at low densities in all vegetation types. Juvenile fronds are reddish, and fertile fronds are produced in summer.

Distribution: G, I, N, T. *Dean 802* (BOL); *Roux 2066, 2074, 2145, 2186* (NBG).

DAVALLIACEAE

Davallioideae

Rumohra adiantiformis (G. Forster) Ching: 70 (1934).

Polypodium adiantiforme G. Forster: 14 (1786).

Restricted to the coastal slopes, mostly below 250 m, although a small population was found on the slump below the northwest-facing scarp at \pm 400 m. It is common in tussock grassland, primarily in *Blechnum penna-marina* heath, often forming large stands on steep slopes and ridges. It is scarce on the northeast coast, only found at the huts near the Waterfall.

Distribution: G, I, T. *Dean 772, 799* (BOL); *Roux 2056, 2169, 2182* (NBG).

DENNSTAEDTIACEAE

Dennstaedtiodeae

Histiopteris incisa (Thunb.) J. Sm. var. *carmichaeliana* (Agardh) C. Chr.: 15 (1937).

Pteris vespertilionis (Labill.) J. Sm. var. *carmichaeliana* Agardh: 80 (1839).

Occurs at all altitudes in moist conditions. At low elevations it is restricted to deep shade among *Spartina* tussocks, whereas on the plateau it is more widespread. It is abundant in fern bush, forming dense monospecific stands in some areas (e.g. Harold's Plain), but is scarce in wet heath. The plants are deciduous.

Distribution: endemic var., G, I, N, T. *Dean 808* (BOL); *Roux 2103, 2167, 2188* (NBG).

Hypolepis rugosula (Labill.) J. Sm. var. *villosa-viscida* (Thouars) C. Chr.: 15 (1937).

Polypodium villosa-viscidum Thouars: 33 (1808).

Occurs primarily above 200 m, on the plateau and upper slopes of Inaccessible Island, but also down to sea level at Waterfall Beach. It generally grows in association with breeding birds, and is common in disturbed areas in wet heath. It is absent from the Serengeti where burrow-nesting birds are scarce. On the western scarp it occurs along streambeds under *Spartina* down to 300 m.

Distribution: endemic var., G, I, N, T. *Roux 2091, 2120, 2166, 2187* (NBG).

GRAMMITIDACEAE

Grammitis magellanica Desv. subsp. *magellanica*.

Fairly common on the plateau above 200 m, growing as an epiphyte on caudices of *Blechnum palmiforme* and, less frequently, on moist, shaded cliffs. All the *Grammitis* collections made during the expedition conform with the diagnostic features of *G. magellanica* var. *magellanica* provided by Parris (1981). It therefore appears as if *G. poeppigiana* (Parris 1981), which has previously been reported from Inaccessible, is incorrect.

Distribution: G, I, N, T. *Dean 837* (BOL); *Roux 2126, 2127, 2128, 2152, 2153, 2156, 2165* (NBG).

HYMENOPHYLLACEAE

Hymenophyllum aeruginosum (Poir.) Carm.: 518 (1818).

Trichomanes aeruginosum Poir.: 76 (1808).

A common epiphyte or lithophyte in moist, shaded localities above 200 m. It is particularly abundant on caudices of *Blechnum palmiforme* in sheltered locations.

Distribution: endemic, G, I, N, T. *Dean* 836 (BOL); *Roux* 2095, 2118, 2135, 2215, 2216 (NBG).

H. peltatum (Poir.) Desv.: 333 (1827).

Trichomanes peltatum Poir.: 76 (1808).

Occurs in similar habitats to *H. aeruginosum*, at elevations above 350 m, but appears to prefer the most shaded, moist sites. It is less abundant than *H. aeruginosum*.

Distribution: G, I, T. *Roux* 2136, 2173 (NBG).

†**Trichomanes angustatum** Carm.: 513 (1818).

Previously recorded from shaded, wet rocks under *Spartina arundinacea* (Groves 1981). It was not recorded during the current survey.

Distribution: I, N, T.

LYCOPODIACEAE

Huperzia insularis (Carm.) Roth.: 60 (1944).

Lycopodium insulare Carm.: 509 (1818).

Fairly common at elevations exceeding \pm 250 m, often in steep, exposed conditions with low vegetation cover. In *Phylica* scrub where plants are more protected they often form large clumps with stems up to 250 mm tall.

Distribution: endemic, G, I, N, T. *Dean* 833 (BOL); *Roux* 2124, 2138, 2159 (NBG).

Lycopodium diaphanum (Beauv.) Swartz: 180 (1806).

Lepidotis diaphana Beauv.: 108 (1805).

Common at all altitudes, in *Blechnum penna-marina* heath, fern bush and wet heath. Although more abundant on exposed ridges and slopes, it also occurs in partially shaded conditions under *Phylica* scrub. Rapidly colonizes slips on the plateau. Spores are released from mid-January to March.

Distribution: endemic, G, I, T. *Dean* 805 (BOL); *Roux* 2097, 2102, 2112 (NBG).

THELYPTERIDACEAE

Amauropelta bergiana (Schlecht.) Holttum var. **tristanensis** Holttum: 134 (1974).

Common at all altitudes, but below 200 m it is largely restricted to bogs among *Spartina* tussock and along watercourses. It is widespread on the plateau, but is nowhere dominant.

Distribution: endemic var., G, I, N, T. *Dean* 815 (BOL); *Roux* 2068, 2075, 2149 (NBG).

SPERMATOPHYTA—GYMNOSPERMAE

PINACEAE

* **Pinus caribaea** Morelet: 106, 107 (1851).

Three trees still grow behind the huts at Waterfall Beach (cf. Wace & Holdgate 1976), with no sign of seedlings despite producing cones with seeds.

Distribution: I. *Ryan* 92 (BOL).

MONOCOTYLEDONES

CYPERACEAE

Carex insularis Carm.: 508 (1818).

Occurs in wetter situations than *C. thoursii* at all altitudes. At sea level it is largely restricted to bogs such as Skua Bog, and on the plateau occurs along watercourses. It is, however, more widespread in wet heath. Distinguished from *C. thoursii* by its triangular (cf. terete) culm and drooping (cf. erect) spike.

Distribution: endemic, G, I, N, T. *Dean* 804, 860 (BOL); *Roux* 2067, 2202 (NBG); *Ryan* 108 (BOL).

C. thoursii Carm.: 508 (1818).

var. **recurvata** Christoph.: 1 (1944).

Widespread in open habitats such as soil slips and around albatross nests. It is distinguished from *C. thoursii* var. *thoursii* by its smaller size, which may merely be a consequence of growing in drier habitats.

Distribution: endemic, G, I, T. *Dean* 788 (BOL, NBG).

var. **thoursii**

Widespread. Occurs in *Phylica* woodland at both Inaccessible and Nightingale, but is most abundant in wet heath on the plateau at Inaccessible. Many of the seed heads are completely denuded by endemic buntings.

Distribution: endemic, G, I, N, T. *Dean* 787, 861 (BOL); *Roux* 2203 (NBG), *Ryan* 58 (BOL).

* **Mariscus congestus** (Vahl) C.B. Clarke: 72 (1897).

Cyperus congestus Vahl: 350 (1805).

Dominant in marshy areas at Blenden Hall, although not yet found at Skua Bog. It has reached the bottom of the rope on West Road at \pm 100 m. It also occurs on wet slips above the beach towards Warren's Cliff, at Salt Beach (one plant), and around the huts at Waterfall Beach. Flowers December–February. Seeds are eaten by the endemic buntings, and this may facilitate dispersal because seeds sometimes are found adhering to feathers around the base of the bill.

Distribution: I, T. *Ryan* 63 (BOL).

Scirpus bicolor (Carm.) Spreng.: 28 (1827).

Isolepis bicolor Carm.: 503 (1818).

var. **bicolor**

An extremely variable species, occurring throughout the islands. Two forms are found on the plateau; one tussock form with very fine leaves and small flower heads that is almost invariably associated with bird-disturbed areas, and one that forms large trailing, tangled mats, characterized by short, broad leaves and few, small-flowered heads. The latter type is particularly abundant in wet heath. At Nightingale a tussock form occurs in dominant stands, forming hummocked meadows.

Distribution: endemic, G, I, N, T. *Dean* 795, 807, 820, 825, 859, 868, 871 (BOL); *Roux* 2064 (NBG); *Ryan* 66 (BOL).

var. **virens** (Boeck.) Hemsl.: 158 (1884).

Scirpus virens Boeck.: 261 (1875).

Forms low tussocks in rocky areas and soil slips in *Spartina arundinacea* tussock vegetation, and also forms fairly robust tussocks on the plateau. The former is common on bare ground above the beach, whereas the latter is widespread in undisturbed vegetation on the plateau. This variety has seeds twice the mass of those of var. *bicolor*.

Distribution: endemic, G, I, N, T. *Dean* 794, 857 (BOL, NBG); *Ryan* 65, 74 (BOL).

S. sulcatus Thouars: 36 (1808).

var. **moseleyanus** (Boeck.) Hemsl.: 155 (1884).

Scirpus moseleyanus Boeck.: 262 (1875).

Distribution: endemic var., G, I, N, T.

var. **sulcatus**

Common at all elevations in open areas, along streams, and in bogs where it forms extensive monospecific stands. Seeds germinate while in the seed head. Flowers earlier at sea level; sprouting seeds were found from December at Skua Bog, but seeds only ripened on the plateau in February–March.

Distribution: endemic var., G, I, N, T. *Dean* 775, 789, 806, 821, 826, 863 (BOL); *Roux* 2051 (NBG); *Ryan* 91 (BOL).

Uncinia brevicaulis Thouars var. *brevicaulis*

Occurs at all altitudes, common in wet heath and widespread in fern bush on the plateau, but restricted to shaded sites near sea level, under *Spartina* tussock, *Phyllica* and apple trees. Plants are smaller at low altitudes, with smaller numbers of seeds per spike and narrower leaves and seed spikes. Seeds collected near sea level average only half the mass of those from the plateau. The seeds were found attached to the plumage of a wide variety of birds. Flowers October–December, with seeds from December–February.

Distribution: endemic var., G, I, N, T. *Dean* 811 (BOL); *Ryan* 57, 104, 109 (BOL).

U. compacta R. Br. var. *elongata* C.B. Clarke: 395 (1883).

Restricted to the plateau, where it grows in shaded situations in *Phyllica* woodland and other dense vegetation. Dwarf plants were also found growing on moss-covered boulders along the western edge of the plateau. Flowers at the same time or slightly later than *U. brevicaulis*.

Distribution: endemic var., G, I, T. *Ryan* 118 (BOL).

U. meridensis Steyerl.: 61 (1951).

First record for Inaccessible, where it is common on the plateau and upper slopes above 200 m, growing in open areas in wet heath and fern bush. Unlike other species of *Uncinia*, it often forms dense stands up to 5 m in diameter. Flowers slightly earlier than *U. brevicaulis*.

Distribution: G, I, T. *Dean* 849 (NBG); *Ryan* 52 (BOL).

LILIACEAE

* **Phormium tenax** J.R. & G. Forster: 48, t. 24 (1776).

Introduced to Waterfall Beach area, it was reportedly grazed out by cattle (Wace & Holdgate 1976). However, Wace & Ollier (1984) noted it to be well established on the northern cliffs of Inaccessible in 1976. We found \pm 20 plants, many flowering, growing halfway up the cliffs above the huts at Waterfall Beach. None were found at the huts, and only one plant (not in flower) was found on the plateau. A control programme similar to that operating at Nightingale should be instigated to eradicate this aggressively invasive species.

A few plants were found along the edge of First Pond and in *Phyllica arborea* woodland at Nightingale, but these were all fairly small non-flowering plants and the ongoing control programme appears to be successful.

Distribution: I, N, T. *Dean* 866 (BOL); *Roux* 2210 (NBG).

POACEAE

† **Agrostis carmichaelii** J.A. Schultes & J.H. Schultes: 571 (1827).

Previously collected from Inaccessible (Groves 1981), none was identified during the current survey.

Distribution: endemic, I, T.

* **A. gigantea** Roth: 31 (1788).

Collected from the huts at Waterfall Beach (Groves 1981). Two unidentified grasses lacking reproductive organs were collected at this site on 16 February 1990 [*Ryan* 97, 100 (BOL)].

Distribution: I, T.

A. goughensis C.E. Hubb.: 383 (1981).

First record for Inaccessible and the Tristan group *sensu stricto*. Fairly common along watercourses on the northern and eastern plateau; not seen away from streams. Flowers January–February.

Distribution: endemic, G, I. *Ryan* 79, 114, 116 (BOL).

A. holgateana C.E. Hubb.: 383 (1981).

First record for Inaccessible. Fairly common on the plateau and upper slopes, where it forms tussocks up to 200 mm high or cushions up to 100 mm high.

Distribution: endemic, I, T. *Ryan* 76, 105, 124 (BOL).

A. magellanica Lam. subsp. *laeviuscula* C.E. Hubb.: 381 (1981).

A large, robust grass restricted to watercourses on the lower, eastern plateau. Flowers January–March.

Distribution: endemic subsp., G, I, T. *Ryan* 115 (BOL).

A. media Carm.: 504 (1818).

Fairly common on the plateau and upper slopes above 250 m, where it forms small, dense cushions in exposed areas. It is often found on steep slopes, such as banks and low cliffs.

Distribution: endemic, G, I, T. *Ryan* 59, 67, 68 (BOL).

* **A. stolonifera** L. subsp. *stolonifera*.

Collected from the huts at Waterfall Beach (Groves 1981). Two unidentified grasses lacking reproductive organs were collected at this site on 16 February 1990 [*Ryan* 97, 100 (BOL)].

Distribution: G, I, T.

† **A. trachylaena** C.E. Hubb.: 383 (1981).

Previously collected from Inaccessible (Groves 1981), none was identified during the current survey.

Distribution: endemic, I, N.

A. wacei C.E. Hubb.: 383 (1981).

First record for Inaccessible. Restricted to the western plateau and upper slopes, where it grows in exposed, open situations including boulders, streambanks and disused albatross nests.

Distribution: endemic, I, T. *Dean* 845 (PRE); *Ryan* 122 (BOL).

* **Aira caryophyllea** L.: 66 (1753).

Fairly common in disturbed sites and on rocks. Found at all altitudes, at Blenden Hall, along the West Road, the western plateau rim and at a few localities on the central plateau.

Distribution: I, T. *Ryan* 55, 70 (BOL).

Calamagrostis deschampsiiiformis C.E. Hubb.: 383 (1981).

First record for Inaccessible. Common tussock-forming grass on the plateau above 300 m. Typically grows on exposed ridges in *Blechnum palmiforme* heath where tree ferns are shorter and less dense. It is co-dominant with *B. palmiforme* on the upper slopes of Dune Hills. Flowers December–February.

Distribution: endemic, G, I, T. *Ryan* 75 (BOL).

* **Cynodon dactylon** (L.) Pers.: 85 (1805).

Panicum dactylon L.: 58 (1753).

A dense stand occurs around the huts and old cultivated area at Waterfall Beach, and has colonized the edge of the boulder beach. The proportion of seeds set was 1% ($n = 239$), possibly accounting for the lack of spread beyond this single locality.

Distribution: I, T. *Ryan* 96 (BOL).

† **Deschampsia christophersenii** C.E. Hubb.: 388 (1981).

Collected at Inaccessible during the Norwegian Expedition in 1937–38, but not found during the current survey.

Distribution: endemic, I, T.

D. mejlandii C.E. Hubb.: 389 (1981).

A fairly scarce, robust grass restricted to a few sites in wet heath along the western edge of Inaccessible. Flowers January–February.

Distribution: endemic, I, T. *Ryan* 88 (BOL).

Glyceria insularis C.E. Hubb.: 394 (1981).

Occurs on the plateau, extending down along watercourses to \pm 150 m above the Waterfall. Only found away from watercourses in wet heath on the highest part of the island. Flowers October–December.

Distribution: endemic, G, I, T. *Dean 829* (BOL); *Ryan 113* (BOL).

* **Holcus lanatus** L.: 1048 (1753).

The second most widespread alien plant at Inaccessible, occurring at all altitudes, and in habitats ranging from mesic to boggy. It is common in disturbed sites such as slips and paths at Blenden Hall, and is widespread on the periphery of Skua Bog. It is the only alien to colonize undisturbed natural vegetation, and is found widely in *Blechnum pennamaryna* heath and sparse *Spartina* tussock grassland at Blenden Hall. It also occurs on slips above the beach between Blenden Hall and Warren's Cliff, but is scarce on the northwestern coast, and found only at Waterfall Beach. *H. lanatus* forms dominant stands along much of the western edge of the plateau, but is scarce elsewhere on the plateau, primarily occurring along watercourses and in some *Scirpus sulcatus* bogs. It is common in disturbed areas at Nightingale, especially along the path from the huts to The Ponds. Flowers November–January, and the seeds are eaten extensively by buntings.

Distribution: G, I, N, T. *Dean 790, 856* (PRE); *Ryan 56* (BOL).

* **Poa annua** L.: 68 (1753).

Restricted to the western edge of the plateau, where it occurs in bird-disturbed areas. Extends down the West Road to ± 200 m. However, it is more common at Nightingale, where it occurs along the path leading between the huts and First Pond. It is also a common weed around the huts at Nightingale. Flowers October–February.

Distribution: G, I, N, T. *Dean 843, 872* (PRE); *Roux 2131, 2209* (NBG); *Ryan 102, 103, 107* (BOL).

† **Polypogon mollis** (Thouars) C.E. Hubb. & E.W. Groves: 399 (1981).

Phalaris mollis Thouars: 37 (1808).

Collected on the western plateau of Inaccessible during the Norwegian Expedition in 1937–38, it was not found during the current survey.

Distribution: endemic, I, T.

Spartina arundinacea (Thouars) Carm.: 504 (1818).

Poncelletia arundinacea Thouars: 36 (1808).

Occurs primarily on the coastal slopes, where it forms dense stands that often exclude all other vascular plants. Sparse stands occur in wet heath on the western plateau, but it is scarce in fern bush over much of the plateau, with only scattered patches at the river junction below Denstone Hill and in Round Hill. It extends up the low-lying, steep-sided river valleys above the Waterfall and southwest of Joe's Hill. Flowers October–December, with seed heads persisting until at least March. Seed heads size is related to plant size, and is greatest at sea level where plants can exceed 3 m in height. *Spartina* constitutes the dominant vegetation over most of Nightingale.

Distribution: G, I, N, T. *Dean 844, 845* (BOL).

* **Vulpia bromoides** (L.) S.F. Gray: 124 (1821).

Festuca bromoides L.: 75 (1753).

Fairly common introduced species, found at scattered localities on Inaccessible, from sea level to 400 m. It is particularly common on the slips and talus slopes adjacent to the West Road.

Distribution: I, T. *Roux 2098* (NBG); *Ryan 71, 89, 101, 106, 117, 128, 129* (BOL).

DICOTYLEDONES

APIACEAE

Apium australe Thouars: 43 (1808).

Common at all altitudes and in all the vegetation types. It is often associated with disturbed areas such as slips. On the exposed western plateau, plants are smaller, adopting the height of the surrounding vegetation, and have more robust and more finely dissected leaves than plants in sheltered sites. Flowers November–February.

A discrete form of *Apium* was found in association with *A. australe*, from which it differs in the longer and fewer leaves, the purplish petiole bases and the less strong odour when the leaves are crushed. This form grows up to 1.2 m tall in habitats where *A. australe* seldom exceeds 300 mm. It is fairly common on the plateau, principally in *Spartina* grass-

land between Molly Bog and Dune Hills, and at Where-the-Pig-Fell-Off, and less frequently in wet heath. Also occurs sporadically elsewhere on the plateau, such as along the river at Denstone Hill. Extends almost to sea level in *Spartina* tussock on the southwestern flank of Dune Hills. On Nightingale it occurs commonly along the path between the huts and The Ponds. Flowers from late November (Nightingale) to February.

Distribution: G, I, N, T. *Dean 771, 822* (BOL); *Roux 2055* (NBG); *Ryan 62* (BOL).

*† **Centella asiatica** (L.) Urban: 287 (1907).

Hydrocotyle asiatica L.: 234 (1753).

Reported from the huts at Waterfall Beach in 1962 (Wace & Dickson 1965), but no plants could be located (Groves 1981). We found no trace of this species, which is common at Tristan.

Hydrocotyle capitata Thouars: 43, t. 12 (1808).

Common at all altitudes, primarily in damp localities. It is most abundant in wet heath, in damp, open places amongst *Spartina* tussocks, and in bogs near sea level. Often grows amongst rank alien grasses along watercourses.

Distribution: G, I, T. *Dean 797* (BOL); *Ryan 61* (BOL).

ASTERACEAE

Chevreulia sarmentosa (Pers.) Blake: 85 (1925).

Tussilago sarmentosa Pers.: 456 (1807).

Collected from Inaccessible during the 1937–38 Norwegian Expedition (Groves 1981). Not found during the current survey.

Distribution: I, T.

* **Conyza albida** Willd. ex Spreng.: 512 (1826).

First record for Inaccessible Island. It is one of the most widespread and abundant alien plants, and is common on slips and other disturbed areas such as paths at Blenden Hall, Dirleton Point and Waterfall Beach. It also occurs along the West Road, and at several localities just below the plateau edge. However, it is rare on the plateau. Bushes can attain a height of 1.6 m in sheltered gulleys and have over 1 000 flower heads that produce copious small, plumed seeds.

Groves (1981) listed this plant as *C. sumatrensis* (Retz.) E.H. Walker. The correct name, however, appears to be *C. albida* (Guédès & Jovet 1975).

Distribution: I, T. *Dean 784* (BOL); *Roux 2078* (NBG); *Ryan 60* (BOL).

* **Cotula australis** (Sieber ex Spreng.) J.D. Hook.: 128 (1852).

Anacyclus australis Sieber ex Spreng.: 497 (1826).

Only collected at Nightingale, where it grows with *C. moseleyi* in disturbed areas along the path leading between the huts and The Ponds.

Distribution: N, T. *Roux 2214* (NBG).

C. moseleyi Hemsl.: 152 (1884).

Widespread on Nightingale Island, occurring in disturbed or open habitats. It is common along the path from the huts to The Ponds and around yellow-nosed albatross nests, but also grows in shaded rock crevices on low cliffs.

Distribution: endemic, N. *Dean 865* (BOL); *Roux 2213* (NBG).

Gnaphalium thouarsii Spreng.: 473 (1826).

Widespread on the plateau, typically in disturbed or open sites such as slips, around bird colonies and the periphery of rocks. Frequently colonizes deserted albatross nests. Occurs down to ± 250 m on the western scarp, the approximate limit of frequent orographic cloud, but a few plants occur at sea level at The Waterfall. Biennial, flowering November–January, and seeds January–March.

Distribution: endemic, G, I, N, T. *Dean 819* (BOL).

Lagenophora nudicaulis (Comm. ex Lam.) Dusén: 98 (1900).

Aster nudicaulis Comm. ex Lam.: 308 (1783).

Fairly common on the plateau above 200 m, where it occurs primarily in *Blechnum palmiforme* heath. Grows on mosses and as an epiphyte

on the caudices of *B. palmiforme*. Occasionally forms a continuous mat up to 1 m across.

Distribution: G, I, T. *Dean 818* (BOL); *Roux 2104* (NBG); *Ryan 77* (BOL).

* *Pseudognaphalium luteo-album* (L.) Hilliard & Burt: 206 (1981).

Gnaphalium luteo-album L.: 851 (1753).

Fairly common, occurring on slips and along paths on the west-facing coastal slopes up to \pm 350 m above sea level. It is absent from the plateau, but small pockets occur at sea level near Waterfall Beach and on a coastal slip at Joe's Hill.

Distribution: I, T. *Dean 783, 845* (BOL); *Roux 2079* (NBG).

* *Sonchus oleraceus* L.: 794 (1753).

A common weed, occurring along most of the coastline where it is abundant on slips and bare earth above the beach. It also occurs on coastal slips, and extends up to 400 m above sea level along the West Road and the adjacent slump. It is very scarce on the plateau (*contra* Preece *et al.* 1986), and grows in drier habitats than other introduced plants. Flowers October–March.

Distribution: G, I, N, T. *Dean 770* (BOL); *Roux 2050, 2077, 2212* (NBG).

BRASSICACEAE

* *Brassica rapa* L.: 666 (1753).

Approximately 30 bushes are restricted to within 10 m of the huts at Waterfall Beach. All had ripe seed pods on 16 February 1990.

Distribution: I, T. *Ryan 99* (BOL).

Cardamine glacialis (G. Forster) DC.: 264 (1821).

Sisymbrium glaciale G. Forster: 32 (1789).

Scarce in wet heath, where it was only recorded on the south slope of Swale's Fell, flowering in October.

Distribution: G, I, T. *Dean 842* (BOL).

*† *Raphanus sativus* L.: 669 (1753).

Collected at Waterfall Beach in 1937 (Groves 1981), it has not been found subsequently and has probably died out.

CALLITRICHACEAE

Callitriche christensenii Christoph.: 7 (1934).

Common in streams and marshy areas on the plateau, often in association with white-chinned petrel burrows. Occurs at sea level in some rivers (e.g. the Waterfall) and seepages (e.g. at Dirleton Point). Forms a floating mat in streams, but also grows on wet mud and on rock faces in waterfalls. Flowers from October to January.

Distribution: endemic, G, I, N, T. *Dean 830, 874* (BOL).

CARYOPHYLLACEAE

* *Cerastium fontanum* Baumg. var. *triviale* (Link) Jalas: 63 (1963).

Cerastium triviale Link: 433 (1822).

Restricted to the edge of the plateau, chiefly between Swale's Fell and Ringeye Valley, but with a few individuals on Joe's Hill. Grows on bare earth and rocks along the scarp edge, typically where the vegetation has been severely trampled by birds. However, also occurs commonly in the large stand of *Holcus lanatus* at the top of the West Road, and a few individuals occur down to 250 m on the West Road. Flowers December–January.

Distribution: G, I, T. *Ryan 72* (BOL).

CHENOPODIACEAE

† *Atriplex plebeja* Carm.: 508 (1818).

Known from the Nightingale archipelago and Tristan (Groves 1981), this species was not recorded during the current survey.

Distribution: endemic, N, T.

Chenopodium ambrosioides L. var. *tomentosum* (Thouars) Aellen: 6 (1968).

Chenopodium tomentosum Thouars: 38 (1808).

Patchily distributed along the upper slopes on the western side of Inaccessible, extending to sea level on the northeast coast at Waterfall Beach and Salt Beach, where dominant stands occur. Along the plateau edge often grows in sheltered, west-facing crevices and on rock faces. Forms a small bush up to 1.2 m high, flowering January–February.

Distribution: endemic var., G, I, N, T. *Ryan 80, 95* (BOL).

CONVOLVULACEAE

Calystegia sepium (L.) R. Br. subsp. *americana* (Sims) Brummitt: 216 (1965).

Convolvulus sepium L.: 153 (1753) var. *americanus* Sims: t. 732 (1804).

Patchily distributed up to 200 m above sea level. It is most abundant at Blenden Hall, where it occurs as a creeper on *Spartina* and on rank growth on slips. Smaller patches occur at the huts at Waterfall Beach and on the steep seaward slope between Joe's Hill and South Hill. The only place it was found on the plateau was in the river valley above Waterfall Gulch, between Round Hill and Denstone Hill. It has pubescent leaves longer than 30 mm, and large pink flowers are present November–January. No seeds were found on plants from Blenden Hall, but seeds were fairly common at Waterfall Beach.

Distribution: I, T. *Dean 773* (BOL); *Roux 2060* (NBG); *Ryan 64* (BOL).

† *C. soldanella* R. Br.: 483 (1810).

Listed erroneously as occurring on Inaccessible by Wace & Dickson (1965: 334, but not in the appendix, p. 338). There is no suitable habitat for this sand-loving species at Inaccessible or Nightingale.

C. tuguriorum (G. Forster) R. Br. ex J.D. Hook.: 183 (1852).

Convolvulus tuguriorum G. Forster: 14 (1786).

Restricted to a 50 m stretch of *Spartina* tussock behind the beach immediately north of Tern Rock, Blenden Hall. The trailing stems form a dense mat over the *Spartina*. Flowers in early December, but no seed was set (possibly due to the absence of an appropriate pollinator). The flowers are white and are smaller than those of *C. sepium*, and the leaves are less than 30 mm long and are glabrous. Groves (1981) considers this species to be probably native to Inaccessible, but the restricted range suggests that it is a recent arrival. Its spread may be limited by vegetative reproduction.

Distribution: I. *Dean 796* (BOL); *Ryan 53* (BOL).

EMPETRACEAE

Empetrum rubrum Vahl ex Willd.: 713 (1806).

Common at all altitudes in open habitats. Colonizes slips, but also grows among mosses and low ferns in *Blechnum penna-marina* heath and fern bush. It also occurs in exposed situations in rock crevices. However, it is virtually absent from wet heath and heavily shaded sites. The dark red berries ripen December–March and are eaten extensively by the endemic thrushes and buntings.

Distribution: G, I, N, T. *Dean 832* (BOL); *Roux 2181* (NBG).

GERANIACEAE

Pelargonium grossularioides (L.) L'Hérit. in Aiton: 420 (1789).

Geranium grossularioides L.: 679 (1753).

Fairly common on partially revegetated soil slips and among rocks in *Spartina* tussock vegetation up to 200 m on the west side of Inaccessible. Absent from the plateau, and only a few individuals recorded from rock crevices on the scarp edge above the Waterfall. Distribution is similar to many alien plants, probably as a result of similar habitat requirements. Flowers from October to February.

Distribution: I, T. *Dean 780* (BOL); *Roux 2217* (NBG); *Ryan 54* (BOL).

OXALIDACEAE

* *Oxalis corniculata* L.: 624 (1753).

This species was spreading rapidly at Waterfall Beach in 1873 (Moseley 1892), but had disappeared by 1968 (Wace & Holdgate 1976). We found none at Salt Beach, but on 3 March 1990 several plants in flower and with ripe seed pods were found on the ridge northwest of the Waterfall at ± 200 m. Preece *et al.* (1986) reported it from Pig Beach Hill, an area not visited during this survey.

Distribution: I, T. *Ryan 125* (BOL).

PIPERACEAE

Peperomia berteriana Miq. subsp. *tristanensis* (Christoph.) Valdebenito *et al.*: 122 (1990).

Peperomia tristanensis Christoph.: 5 (1944).

Restricted to a small side gully ± 200 m upstream from the top of the Waterfall. Six small plants were found, all growing in a wet, deeply shaded gully, with no sign of flowers or fruit in March. Several saplings apparently resulted from vegetative sprouting of branches that had been knocked off.

Distribution: I. *Ryan 126* (BOL).

PLANTAGINACEAE

* *Plantago major* L.: 112 (1753).

Common on soil slips, particularly on the west-facing scarp, and on mesic open areas above the beach, including seepages on cliffs and on the fringes of bogs at Blenden Hall. A few plants occur on the plateau rim at up to 500 m altitude. Two forms occur, differing in the density of hairs on the leaves.

Distribution: G, I, T. *Dean 791, 793, 846* (BOL); *Roux 2060* (NBG); *Ryan 81* (BOL).

POLYGONACEAE

* *Rumex acetosella* L. subsp. *angiocarpus* (Murb.) Murb.: 41 (1899).

Rumex angiocarpus Murb.: 46 (1891).

Collected from Salt Beach in 1873, but has not been found there subsequently (Wace & Holdgate 1976; pers. obs.). Preece *et al.* (1986) recorded it from Pig Beach Hill in 1982-83, which was not visited during this survey. We recorded it only from the river junction below Denstone Hill on the plateau at ± 220 m, where it was found in short *Blechnum penna-marina* heath and along the edge of a *Sphagnum* bog.

Distribution: G, I, T. *Ryan 83* (BOL).

R. frutescens Thouars: 38 (1808).

Occurs up to ± 450 m in tussock grassland and wet heath, but absent from fern bush. It is common along the back of the boulder beaches, but also occurs in wet areas along watercourses in *Spartina* tussock and growing on the mat of *Scirpus sulcatus* at Skua Bog. Its seeds are eaten by the endemic buntings.

Distribution: G, I, T. *Dean 781* (BOL); *Roux 2061* (NBG).

* *R. obtusifolius* L. subsp. *obtusifolius*

The most widespread introduced plant at Inaccessible, it is common at all altitudes in disturbed and marshy places. It colonizes soil slips and other disturbances including albatross nests. Over much of the plateau it is restricted to watercourses, and seldom penetrates undisturbed natural vegetation. It is not listed from Nightingale (Groves 1981), but has been recorded there (Wace & Dickson 1965; Wace 1967; Wace & Holdgate 1976), and is common along the path between the huts and the Ponds. The seeds are eaten by the endemic buntings.

Distribution: G, I, N, T. *Dean 785, 851, 869* (BOL); *Roux 2208* (NBG).

RANUNCULACEAE

Ranunculus muricatus L.: 555 (1753).

As the material collected is sterile it could not be identified positively. Nicholas (pers. comm.) suggested that it may also be *Hydrocotyle ranunculoides* L.f. However, this is the first record of this plant for

Inaccessible Island. Uncommon, restricted to the southwestern edge of the plateau. It is scarce in wet heath, in rank grass and sedges with *Hydrocotyle capitata*, between Boulder Hill and Swale's Fell. Also occurs sporadically in wet spots next to whitechinned petrel burrows southeast of Molly Bog.

Distribution: I. *Dean 841* (BOL); *Ryan 110* (BOL).

RHAMNACEAE

Phyllica arborea Thouars: 45 (1808).

Common from sea level up to ± 450 m. In the more sheltered parts of the island it is dominant, growing up to 5 m tall. Flowering occurs from late October to March, but most flower in December-January (at sea level) and January-February (on the plateau), with little synchronism between trees. Fruits develop throughout the year, ripening and releasing the seeds just prior to or during flowering. Stunted plants on the high western plateau do not flower. The fruits are an important food for the endemic Wilkins' bunting (*Neospiza wilkinsi*). Flies visit the odorous flowers and may effect pollination.

Distribution: G, I, N, T. *Dean 786, 870* (BOL); *Roux 2089, 2197* (NBG).

ROSACEAE

Acaena sarmentosa (Thouars) Carm.: 502 (1818).

Ancistrum sarmentosum Thouars: 44 (1808).

Common above 200 m in all plant associations. Occurs down to sea level at Waterfall Beach and to 100 m above Blenden Hall in Nelson's Gulch. It is most abundant in wet heath. In fern bush it is typically associated with areas disturbed by breeding birds, and is thus virtually absent from the Serengeti. Flowers mid-October to November, with seed heads present chiefly in December-January, although flowering occurs later on exposed ridges. The seeds bear recurved hooks and are frequently entangled in the plumage of yellow-nosed albatrosses (*Diomedea chlororhynchos*) and other sea birds.

Distribution: G, I, N, T. *Dean 814, 867* (BOL); *Roux 2106, 2198* (NBG).

A. stangii Christoph.: 7 (1944).

Fairly common above 400 m in *Blechnum penna-marina* and wet heath, where it often grows in rock crevices and cliffs. The leaves, flower heads and seeds are smaller than those of *A. sarmentosa*, and the seeds lack recurved barbs. Apparently flowers slightly later than does *A. sarmentosa*.

Distribution: endemic, G, I, T. *Ryan 90* (BOL).

* *Malus domestica* Borkh.: 1272 (1803).

Two groves of planted trees flourish in hollows behind Blenden Hall, and there are some trees at Salt Beach (Wace & Dickson 1965). Single plants occur behind the hut at Blenden Hall (two), and on the plateau above the West Road (one) and in Ringeye Valley (one). The species apparently is not invasive. Budding and flowering occurs in November, and fruit are ripe in March-April. A small grove is established near The Ponds on Nightingale Island.

Distribution: I, N, T. *Dean 812, 862, 877* (BOL).

RUBIACEAE

Nertera assurgens Thouars: 42, t. 11 (1808).

Occurs primarily above 200 m, although reaches sea level along a stream at Salt Beach. It is the most abundant *Nertera* in wet heath, and appears to prefer damper situations than *N. depressa*; in fern bush it grows in well-shaded sites. Fruits present in October, but these are scarce and may be left over from the previous season. Most fruits ripen in January-March. It has medium-sized, pale green leaves (not glossy) with crenulate margins.

Distribution: endemic, I, T. *Ryan 86* (BOL).

N. depressa Banks & Sol. ex Gaertn.: 124 (1788).

Occurs at all altitudes and in all plant associations. Near sea level it is common on moss grown rocks, slips and occasionally on cliffs. In fern bush it frequently occurs as an epiphyte on the caudices of *Blechnum palmiforme*, occasionally growing over the crown. However, it is scarce

in wet heath. Fruits are present throughout the summer. It is distinguished from the other *Nertera* species by its small (<5 mm long), entire leaves.

Distribution: G, I, N, T. *Dean* 774, 853, 876 (BOL); *Roux* 2057 (NBG); *Ryan* 85 (BOL).

N. holmboei Christoph.: 13 (1944).

The scarcest *Nertera* on Inaccessible, restricted to the plateau where it is patchily distributed in fern bush. Typically occurs in the shade under *Blechnum palmiforme* or *Phylica arborea*, but also occurs in the open on the flanks of Swale's Fell. Apparently fruits later than other *Nertera* species, with the first ripe fruits appearing in March. It is distinguished by its large (typically >10 mm long), entire, glossy dark green leaves.

Distribution: endemic, I, N. *Dean* 816, 873 (BOL); *Roux* 2115 (NBG); *Ryan* 87, 121 (BOL).

SALICACEAE

* *Salix babylonica* L.: 1048 (1753).

Two or three stunted trees grow in tall *Spartina* tussock at Salt Beach, with no sign of reproductive organs in February.

Distribution: I, T. *Ryan* 94 (BOL).

SCROPHULARIACEAE

* *Veronica serpyllifolia* L.: 12 (1753).

Not listed by Groves (1981) from Inaccessible, but recorded by Wace & Dickson (1965) and Preece *et al.* (1986). It is common on exposed

areas such as soil slips above Blenden Hall, especially the slips adjacent to the West Road and on the slump below the plateau edge north of the West Road. Isolated patches also occur at Boulder Hill and Swale's Fell.

Distribution: I, T. *Dean* 809, 824 (BOL); *Roux* 2183 (NBG); *Ryan* 73, 111 (BOL).

SOLANACEAE

†*Physalis peruviana* L.: 1670 (1753).

Collected once from Inaccessible in 1938 during the Norwegian Expedition (Groves 1981). There are no other records for the Tristan group.

* *Solanum nigrum* L.: 186 (1753).

Relatively uncommon introduced species, found mainly between Blenden Hall and Warren's Cliff. Two individual plants were also found at Salt Beach and Waterfall Beach. Occurs on slips and adjacent to the West Road up to \pm 200 m, but one plant was found on the western plateau rim in a bird-disturbed area at 450 m. Flowers October to March.

Distribution: I, T. *Dean* 803 (BOL); *Roux* 2080 (NBG).

* *S. tuberosum* L.: 185 (1753).

Not listed by Groves (1981), but reported by Wace & Dickson (1965). Potatoes were restricted to the immediate vicinity of the huts at Waterfall Beach, and were flowering in February.

Distribution: I, (T). *Ryan* 93 (BOL).