# SOME RECENT RECORDS OF NATIVE AND ALIEN FLOWERING PLANTS FROM THE FALKLAND ISLANDS

By D. M. MOORE\* and W. J. L. SLADEN†

ABSTRACT. The collections of vascular plants made by Sladen during 1949–51, together with some material collected by Hamilton, contain two native species new to the archipelago, Sisyrinchium chilense Hook, and Suaeda fruticosa Forsk. s. lat. Carex acaulis D'Urv. and C. decidua Boott, were collected for the first time in a century, while six species were not hitherto known from West Falkland. These collections also contain 28 introduced species new to the islands which, together with a further new record from the 1961 Holdgate collection, results in a total recorded alien flora of 89 species. The 66 alien species present in the Sladen and subsequent British Antarctic Survey collections are grouped according to the habitats they occupy and an indication is given of their frequency. It is shown that species of cultivated ground are mostly recorded for the first time, while almost all alien species which have been established in the native vegetation have been reported by previous workers. The data allow some preliminary assessment to be made of the relative vigour and persistence of the introduced species occurring in the Falkland Islands.

Knowledge concerning the plants occurring in the Falkland Islands has been based largely on Skottsberg's (1913) comprehensive paper "A Botanical Survey of the Falkland Islands", to which were added further records and comments by Marquand (1923) and Skottsberg (1929). Since then, Falkland Islands representatives have been treated in several monographic studies, e.g. Ranunculaceae (Lourteig, 1952), Oreomyrrhis (Mathias and Constance, 1955), Hieracium (Sleumer, 1956) and Erigeron (Solbrig, 1962), but only two additions to the flora have been published during this period—the ferns Botrychium dusenii (Alston, 1960) and Grammitis billardieri (Philcox, 1962).

A number of visits were made to the Falkland Islands during 1949–51 by Sladen, whilst serving as medical officer and biologist with the Falkland Islands Dependencies Survey. The plant collections which he made in various parts of the archipelago (for itinerary see Appendix; Fig. 1) were forwarded to the British Museum (Nat. Hist.), together with some specimens collected by the late Dr. J. E. Hamilton. The bulk of this material was subsequently sent to Dr. C. Skottsberg of Göteborg for confirmation or further identification. Dr. C. Blom (Göteborg) and Dr. A. Melderis (British Museum (Nat. Hist.)) determined a number of the grasses. These collections contain a number of undoubtedly native species which are either new to the Falkland Islands or which represent interesting range extensions within the archipelago. In addition, a large number of introduced species, many not recorded hitherto, are present.

Dr. Skottsberg considered the new information resulting from the Sladen and Hamilton collections to be worthy of publication but, unfortunately, this was not achieved before his death. Miss I. Skottsberg has very kindly placed at our disposal her father's rough notes concerning these collections and we have made the fullest use of them in preparing this paper.

The Sladen collection, comprising 304 gatherings, contains 282 angiosperms and 22 pteridophytes. The Hamilton collection, of 75 gatherings, contains 63 angiosperms and 7 pteridophytes. All the material is deposited in the Botany Department, British Museum (Nat. Hist.) [BM], apart from 25 duplicates, which are in the reference herbarium of the British Antarctic Survey, Department of Botany, University of Birmingham [BIRM]. Dr. Skottsberg's rough notes are deposited at the British Museum (Nat. Hist.).

Subsequent to Sladen's visits, a number of British Antarctic Survey personnel have made small plant collections, all in the vicinity of Port Stanley, whilst in the Falkland Islands en route to or from the stations farther south. Since this material contains only one species, an alien, not recorded by Sladen, we include it in order to complete the lists of introduced species given in this account. This material is housed in the British Antarctic Survey herbarium at the University of Birmingham, and comprises the following collections: H. Dollmann, 1960–61

<sup>\*</sup> Department of Botany, University of Leicester.

<sup>†</sup> Department of Pathobiology, Johns Hopkins University, Baltimore, Maryland, U.S.A.

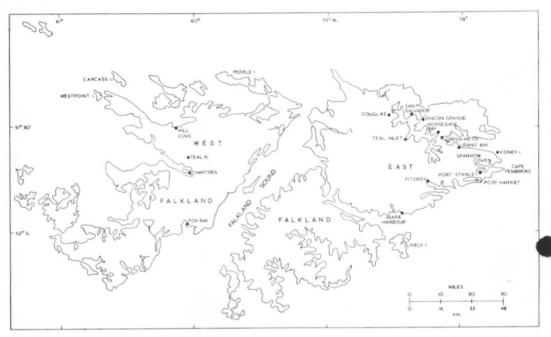


Fig. 1. Map of the Falkland Islands indicating the principal localities visited by Sladen during 1949–51 (Appendix). Little Chartres House and Goring House, which are not shown, are situated about 3 miles (4·8 km.) east-south-east of Chartres.

(1 gathering), S. W. Greene, 1960 (29 gatherings), M. W. Holdgate, 1961 (43 gatherings), J. B. Killingbeck, 1960 (22 gatherings) and B. J. Taylor, 1960 (11 gatherings).

### ADDITIONS TO THE NATIVE FLORA

Two species in the Sladen and Hamilton collections have not been recorded hitherto from the Falkland Islands and there is no reason to doubt that they are native to the archipelago.

Sisyrinchium chilense Hook. West Falkland: Fox Bay East, opposite the doctor's house, dry ground among Empetrum rubrum, fl., 22.v.1949, Sladen JB 121/15; between Chartres and Teal River House, among Cortaderia, 16.xii.1949, Sladen Fa 80/49; Chartres, fl., 19.xii.1949,

Hamilton s.n.; near Teal River, fl. and fr., ii.1951, Hamilton JH 66.

There seem to be no morphological differences between this material and specimens from Patagonia and Tierra del Fuego. In the Falkland Islands plants the perianth segments are completely yellow, while in South American material they are usually blue distally, although "yellow flowers" have been noted in some Patagonian material. The species belonging to this group are in need of taxonomic revision but until that can be achieved the present nomenclature seems appropriate. It is perhaps relevant to quote here an extract from a letter (27 April 1959) sent by Dr. Skottsberg to Mr. J. E. Dandy at the British Museum (Nat. Hist.): "... very likely 'chilense' is an aggregation of forms distributed along the Andes to Patagonia and Tierra del Fuego, where I have seen it several times. The flower colour is yellow in the Falklands, whereas true *chilense* is said to be light blue to almost white, but there are Patagonian specimens in Stockholm marked 'flowers yellow'. Perhaps the yellow plants have some kind of taxonomic standing, but who would like to describe them under a specific name in front of Philippi's dozens of species, most of them known from scraps which have lost their tepals?" It seems probable that this species is not uncommon in the Falkland Islands but it is relatively inconspicuous and easily overlooked.

Suaeda fruticosa Forsk. s. lat. West Falkland: small tussock island in Reef Channel between

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Saunders Island and the mainland, "plants up to 3 ft. (0.9 m.) high, in sandy situations along shore and also on clay cliffs", fl., xii.1949, coll. J. Sollace, comm. Sladen s.n.

The island referred to is probably Calf Island or one of the two smaller unnamed islands

This material is only provisionally referred to S. fruticosa. According to Dr. Skottsberg it is identical with S. magellanica Fenzl. from Isla Isabel in the Straits of Magellan. However, this is a nomen nudum, included by Reiche (1911, p. 174) in S. fruticosa var. brachyphylla Speg., to which he brought all the extreme southern South American material. It is questionable whether any South American Suaeda can be included in S. fruticosa, a widely distributed Eurasiatic species which is quoted from North America, and a comprehensive revision is necessary.

#### NOTEWORTHY RECORDS OF NATIVE SPECIES

Two species in this collection are important because, although not new to the Falkland Islands, they have not been collected there since they were discovered early in the nineteenth century. Neither species was known previously from West Falkland.

Carex acaulis D'Urv., which is endemic to the archipelago, was described from material collected by D'Urville on East Falkland during his visit aboard La Coquille in 1822. West Falkland: between Teal River and Hill Cove, fl.-fr., 16.xii.1949, Sladen Fa 89/49.

Carex decidua Boott., a species occurring in the southern Andes and Fuegia, was discovered by Hooker during the visit of *Erebus* and *Terror* to Berkeley Sound in 1842. West Falkland: Teal River, fl., 18.xii.1949, Sladen Fa 99/49.

A further species, Uncinia brevicaulis Thouars. var. macloviana (Gaud.) Kuek., has not been collected on East Falkland since its discovery (around Port Louis) by Gaudichaud in 1820, although it was reported subsequently from West Falkland by Marquand (1923). East Falkland: Port Harriet to Fitzroy, fr., 25.iv.1949, Sladen JB 108/11.

Skottsberg (1913) showed that, of the total native flora then known, comprising 162 species, 23 were present only on West Falkland and 29 were restricted to East Falkland. This may perhaps reflect historical differences or climatic gradients within the archipelago, but Skottsberg noted that the lists would undoubtedly be altered by further botanical exploration, particularly in West Falkland. In addition to the two above, the Sladen collection contains six more species, listed below, which are reported for the first time from West Falkland.

Carex curta Good. West Falkland: Teal River, damp place by muddy pond, fl., 18.xii, 1949,

Sladen Fa 100/49 (BIRM, BM).

Tetroncium magellanicum Willd. West Falkland: between Teal River and Goring House, Chartres, just north of Rocky Inlet, shallow marshy pond, fl., 19.xii.1949, Sladen Fa 125/49 (BIRM, BM).

Ranunculus hydrophilus Gaud. West Falkland: Teal River to Hill Cove, west of Mount Adam, moist place, fl., 16.xii.1949, Sladen Fa 91/49.

Ranunculus trullifolius Hook. f. West Falkland: Teal River, fl., 18.xii.1949, Sladen Fa 01/49.

Littorella australis Griseb. West Falkland: Teal River, on damp mud of dried-up pond, fl., 18.xii.1949, Sladen Fa 97/49.

Limosella australis R. Br. West Falkland: Teal River, lake east of shepherd's cottage, mud beside water, fl., 19.xii.1949, Sladen Fa 123/49; Carcass Island, fl., xii.1950, Hamilton JH 57.

## INTRODUCED SPECIES

One inevitable botanical consequence of human activities in the Falkland Islands, as in most similar areas, has been the introduction of a considerable number of alien plants. Although some species were deliberately brought into the archipelago for pasture improvement, erosion control, etc., most were undoubtedly introduced accidentally. In an island area such as this, which has been colonized by man relatively recently, it is very interesting to know what alien species arrive over the years and, at intervals, to estimate their status. Such data provide valuable information on the relative colonizing and competitive abilities of the aliens, as well

as the capacity of the native vegetation to withstand these invaders (Holdgate and Wace,

1961).

The Sladen and Hamilton collections contain 60 alien species, 28 of which have not hitherto been reported from the Falkland Islands. Five further species, one new to the islands, were observed but vouchers are not available. The most complete list of alien species previously available was that of Birger (1907) who recorded 38 species. Hooker (1847) mentioned 13 and Skottsberg (1913) 14 introduced species, although the latter was not especially interested in them and stated (Skottsberg, 1929) that he saw more on his travels than he reported. Marquand (1923) listed seven introduced species, while 28 alien ones were noted by Davies (1939) in his

grassland quadrats.

The alien species are grouped below according to the habitats which they occupy in the Falkland Islands, and a general indication of their frequency is given by the symbols: r (rare), o (occasional), c (common), a (abundant). Some idea of their persistence is afforded by indicating as follows those which have been recorded previously: H (Hooker, 1847), B (Birger, 1907), S (Skottsberg, 1913), M (Marquand, 1923) and D (Davies, 1939). Sight records, not supported by Sladen vouchers, are marked with an asterisk. Where a species is included in more than one of the lists the authority for the name, and previous records, are given under the habitat least influenced by man. Thus, a species occurring in lists A, B and C lacks the authority and reference to earlier records in lists A and B.

# A. Gardens and cultivated ground

Anthemis cotula L.	0		Raphanus sativus L.	O
Avena sativa L.	r	В	Rumex obtusifolius L.	O
Capsella bursa-pastoris	c		Senecio vulgaris	c
Coronopus didymus	С		Silene dioica (L.) Clairv.*	r
Ervsimum cheiranthoides L.	r		Sonchus oleraceus L.	r
Euphorbia peplus L.	r		Stellaria media	c-a
Geranium robertianum L.	r		Urtica urens	o-c
Lamium amplexicaule L.	0		Valerianella locusta	r
Lamium hybridum Vill.	O	В	Vicia cracca L.	r
Lamium purpureum L.	o-c	В	Viola arvensis Murr.	C
Mercurialis annua L.	O			

## B. Waste ground, track verges, grazing paddocks, etc., near settlements

В	D	Achillea millefolium L.	0		Montia perfoliata (Willd.) Howell	r
		Agropyron repens (L.) Beauv.	0		Myosotis discolor Pers.	0
HBS		Agrostis stolonifera L.	c		Poa annua	C
В	D	Agrostis tenuis Sibth.	С		Poa pratensis	c
H S	D		0		Puccinellia glaucescens (Phil.) Parodi	r
		Aira praecox	С		Ranunculus repens	c
B	D	Anthoxanthum odoratum L.	0		Rumex acetosella	C
		Bellis perennis	С		Sagina procumbens	c-a
		Bromus condensatus Hack.	r	HB M	Senecio vulgaris L.	C
В		Capsella bursa-pastoris (L.) Medic.	С		Silybum marianum (L.) Gaertn.	r
		Cerastium holosteoides	С		Sisymbrium officinale (L.) Scop.	0
		Cirsium arvense (L.) Scop.	r		Sonchus asper (L.) Hill	0
		Coronopus didymus	c-a		Spergula arvensis L.	c
	D	Cynosurus cristatus L.	O	HB	Stellaria media (L.) Vill.	C
В	D	Dactylis glomerata L.	C	HBS D	Taraxacum officinale Weber*	C
	D	Festuca rubra L.*	C	В	Trifolium aureum Poll.	0
		Galium saxatile L.	0	B D	Trifolium dubium Sibth.	c
		Gnaphalium purpureum	С	B D	Trifolium repens L.*	C
		Holcus lanatus	С		Urtica urens L.	o-c
		Hordeum comosum Presl.	r		Valerianella locusta (L.) Betcke	r
		Hypochaeris radicata	С	D	Vulpia bromoides (L.) S.F. Gray	0
H	D	Lolium perenne L.	С			

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## C. Established away from settlements

BS D	Aira praecox L.	С	D	Hypochaeris radicata L.	o-c
c. 1923	Ammophila arenaria (L.) Link	loc. c		Luzula campestris (L.) DC.	0
B D	Bellis perennis L.	O	BS D	Poa annua L.	c-a
	Calluna vulgaris (L.) Hull	r	H S	Poa pratensis L.	C
	Carex flacca Schreb.†	r	D	Ranunculus repens L.	0
HBS D	Cerastium holosteoides Fr.	O	HBS D	Rumex acetosella L.	C
BS	Coronopus didymus (L.) Sm.	С	HBS	Sagina procumbens L.	c-a
S D	Deschampsia flexuosa (L.) Trin.	С		Schoenoplectus triquetrus (L.) Palla	r
S	Gnaphalium purpureum L.	O	BS D	Ulex europaeus L.	C
B D	Holcus lanatus L.	о-с	HBS D	Veronica serpyllifolia L.	C

<sup>†</sup> New record from the Holdgate 1961 collection.

Although most of the species in this group have undoubtedly become established away from the settlements without direct human interference, the survival of several seems to depend, to some extent, upon such factors as local overgrazing and trampling of the native vegetation. This is particularly striking in the case of *Poa annua* which thrives on the well-trodden ground In and around gentoo penguin rookeries. The penguins trample and destroy the Empetrum throughout their nesting area and, since they move their sites each year, extensive swards of P. annua are now to be found (Davies, 1939). It should also be noted that three species are known to have been deliberately planted away from the settlements. Ammophila arenaria was introduced around 1923 and planted at Cape Pembroke and other localities to control sand blow-outs (Hubbard, 1937); Calluna vulgaris was experimentally planted in the camp at Fitzroy, Green Patch and San Salvador but it has not spread to any extent, while Ulex europaeus, which had been introduced by 1848 (Dallimore, 1919) for use as cattle fencing, has flourished and seems to have spread since then. Since Holcus lanatus is very palatable to stock (Davies, 1939), it has been planted around the settlements and in the native vegetation where it generally establishes itself quite readily. However, it seems probable that the species was accidentally introduced by visitors before permanent settlement.

It is apparent from the above lists that the habitats differ strikingly in the number of previously recorded species occurring in them. Almost all (80 per cent) of the species which are established in the native vegetation away from settlements have been reported earlier, while one of the four exceptions, *Calluna vulgaris*, has already been mentioned as a special case. In contrast, aliens present only in cultivated ground are mostly recorded here for the first time, only 14 per cent having been reported previously. Plants occurring in disturbed ground around settlements fall about midway between these extremes, 14 out of 31 (45 per cent) being newly recorded.

Even such general comparisons as these suggest that those species which are vigorous enough to exist within the native vegetation are also those best able to maintain themselves indefinitely after introduction. Indeed, they must also possess efficient dispersal methods, since hany seem to have arrived fairly soon after man. On the other hand, there seems to be a fairly rapid turn-over of species characteristic of cultivated ground, suggesting that their competitive ability is low, at least in the Falkland Islands, and that they can persist for only a relatively short period. Consequently, the species composition of the flora in such habitats at any time depends to a great extent on the recent influx of aliens from outside. In the above terms it might not seem surprising that species of disturbed ground (list *B*) appear to be of intermediate vigour and persistence between the two classes of aliens already mentioned. It may be noted here that several of the species in this group were introduced as forage plants in semi-natural "meadows" near the settlements.

## Previously recorded alien species

Twenty-three introduced species previously recorded from the Falkland Islands are neither present in the Sladen collection nor mentioned in his field notes. These species are listed below and the authors of earlier reports denoted as before. Some of the omissions certainly result from accidents of sampling, because five species—Elymus arenarius, Geranium molle,

Gnaphalium luteoalbum, Plantago lanceolata and Rumex crispus—were recorded from several localities by Moore during his visit in 1964. However, many of the species were originally reported from cultivated or disturbed ground (habitats A and B above) and may have made only a transitory appearance in the Falkland Islands.

В	Agrostemma githago L.	M	Hordeum jubatum L.
D	Alopecurus pratensis L.	В	Juncus bufonius L.
В	Anthemis arvensis L.	S	Juncus effusus L.
В	Atriplex sp.	В	Leontodon hispidus L.
M	Avena fatua L.	M	Medicago minima (L.) Bartal.
D	Bromus mollis L.	В	Myosotis arvensis (L.) Hill
В	Centaurea cyanus L.	BI	O Phleum pratense L.
S	Cochlearia officinalis L.	B MI	O Plantago lanceolata L.
1923	Elymus arenarius L. (Hubbard, 1937)	HB	Rumex crispus L.
M	Erodium cicutarium (L.) L'Hérit.	В	Sinapis alba L.
В	Geranium molle L.	В	Trifolium hybridum L.
M	Gnaphalium luteoalbum L.		

A more detailed analysis of the relative vigour and fitness of the introduced species is precluded by the lack of accurate data, which results particularly from the tendency to neglect alien species in the earlier accounts, possibly excepting that of Birger (1907). It is to be hoped that lists similar to those given in this paper can be prepared from time to time in the future. These will permit periodic assessments of the establishment and spread of introduced species in the Falkland Islands and provide a firm basis for experimental studies on the alien flora of this and other southern cold temperate areas.

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#### **APPENDIX**

#### SLADEN ITINERARY

(see Fig. 1 for main localities)

1949	
10 April	Arrived Port Stanley.
24 April	Port Stanley to Port Harriet via Mullet Creek.
25 April	Port Harriet to Fitzroy.
26 April	Fitzroy to Port Stanley. Visit to Camber north side of Port Stanley harbour.
30 April	Port Stanley to Murrell River and Drunken Rock Pass; across Jameson's Stream to east of
50 / tpm	Saddleback and north to Round Mountain; to Berkeley Sound and west along Uranie Bay to
	shepherd's cottage opposite Long Island.
1 May	Beside Long Island Creek and then return to Port Stanley via Murrell Bridge, Mount Longdon,
	Mount Vernet, Moody Valley and Mount Tumbledown.
7 May	Port Stanley to Lively Island by sea.
8 May	Lively Island to Port Stanley via Mare Harbour.
12 May	Port Stanley to Teal Inlet by sea via Douglas Station.
13 May	Teal Inlet to San Salvador by sea.
14 May	At San Salvador. To west coast of Port Salvador and opposite Shag Island.
15 May	San Salvador to Port Stanley by sea.
21 May	Port Stanley to Fox Bay East, West Falkland by sea.
22 May	At Fox Bay East, north-east and south-east of settlement.
23 May	Fox Bay to Port Stanley by sea.
27 May	Port Stanley to Carcass Island, West Falkland by sea.
28 May	At Carcass Island.
29 May	Carcass Island to Westpoint Island.
30 May	Westpoint Island to Port Stanley by sea.
11 June	Departed from Port Stanley.
November	Returned to Port Stanley.
26 November	Port Stanley to Monstar Hotel and Surf Bay.
1 December	Port Stanley to Kidney Island in Berkeley Sound, and return by sea.
3 December	Port Stanley to Green Patch via Moody Valley, Mount Longdon, Murrell River, Mount Vernet,
	Uranie Bay and Long Island.
4 December	Green Patch to Rincon Grande.
5 December	At Rincon Grande.
6 December	Rincon Grande to Port Stanley via Horseshoe Bay, Long Island cottage and Mount Vernet area.
15 December	Port Stanley to Chartres, West Falkland via Pebble Island by aeroplane.
16 December	Chartres to Hill Cove via Teal River and west of Mount Adam.
17 December	At Hill Cove.
18 December	Hill Cove to Teal River House.
19 December 20–21 December	Teal River House to Goring House, thence by horse to Fox Bay East.
20–21 Decembe	At Fox Bay East.
22 December	Fox Bay to Port Stanley by sea.
22 December	Fox Bay to Fort Stalley by sea.
1950	
2 January	Port Stanley to Moody Valley, Two Sisters, Mount Harriet, Mount William, Sappers Hill,
2 Juliani	Port Harriet and return.
8 January	Port Stanley to Sparrow Cove, Port William and return.
7	The second secon
1951	
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All the journeys were made on foot, except where indicated.

Port Stanley to Cape Pembroke lighthouse and return. Port Stanley to Mullett Creek, Port Harriet and return.

Port Stanley to Moody Valley and return.

Around Port Stanley.

28 April 19 May

20 May 3-26 June