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THE PLANT-COMMUNITIES IN THE ISLAND OF MATSUWA IN THE MIDDLE KURILES

BY

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中部千島松輪島に於ける植物群落

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INTRODUCTION

The Island of Matsuwa lies about 570 miles north-east from the main island of Hokkoido and about 300 miles from Kamtchatka. It extends from 153°9' to 153°17' E.L. and from 48°2' to 48°8' N.L. It is orbicular-oblong in outline, about 7 miles in width and the area about 20 square miles, including the Island of Banjô.

Matsuwa is a volcanic island, in which the main peak, attaining a height of 1485 m., occupies about its central part. Mt. Fuyô, the highest peak, broke out in a violent eruption in February 1928. The rivers are small, forming often the gullies. The coast is generally rocky and unapproachable, and the sandy beaches are but locally developed between Ainu-wan and Yamato-wan.

THE PLANT-COMMUNITIES

The physiognomy of the Plant-communities of this island shows a comparatively recent formation. Although the vegetation of the lower slope is more or less well established, that of the higher altitude over 800 m. is mostly barren. The plants growing in this island are comparatively poor in kind. The communities in this island may be characterised as follows:—

i) The destitution of the Pinetum.

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ii) The destitution of the Betuletum.

iii) The destitution of the undergrowth of *Sasa kurilensis*.

iv) The well developed Calamagrosetum, dominated by *Calamagrostis Langsdorffii*.

The plant-communities are here treated under the following seven main associations.

1 Forest-associations.
2 Sea-shore-associations.
3 Heath-associations.
4 Grassy land-associations.
5 Herbaceous-associations.
6 Swamp and Bog-associations.
7 Lapilli-slope-associations.

1 Forest-Associations

The vegetation of thickets consists almost entirely of *Alnus fruticosa*. It is worthy of notice that there is complete absence of *Betula Ermani*, *Pinus pumila* and *Sasa kurilensis*. It is also noticeable that *Taxus cuspidata* is found in this island, which is the northernmost limit of its distribution in the Kurile Archipelago.

The alder thickets are distributed as far up as 400 m. from the sea level, forming impenetrable simple bushes. The development of the alder bushes is better on the south-eastern and southern sides. The height of the alder trees varies according to the environmment. It attains a height of 2.5 m. or sometimes more in the valley near Yamato-wan, but farther up on the exposed ridge, dwarf shrubby growth only is met with. Occasionally *Lonicera coerulea* and *Sorbus sambucifolia* are found mixed here and there in the lower places. *Diervilla Middendorffiana* rarely occurs. As the under-layer the following plants are found.

Dryopteris dilatata A. GRAY
Athyrium Filix-femina ROTH
Listera cordata R. BR.
Moehringia lateriflora FENZL
Polystichum Braunii FÉE
Calamagrostis Langsdorffii TRIN.
Stellaria yezoensis MAXIM.
Circaea alpina L.

2 Sea-shore-Associations

Sandy beaches are feebly developed, and consequently the vegetation in

this association is comparatively poor. The following species are found forming the sandy beach-associations of the island:—

Poa macrocalyx TRAUTV. — *Elymus mollis* TRIN.
Aminodenia major KUDO — *Rosa rugosa* THUNB.
Lathyrus maritimus BGL. — *Mertensia maritima* G. DON subsp. *asiatica* TAKEDA
Senecio Pseudo-Arnica LESS.

A similar associatoin extends to the stony shore, where besides the above mentioned plants such plants as *Chrysanthemum arcticum* and *Taraxacum ceratophorum* are found.

On rocky cliffs, the following plants are found:—

Sagina saginoides D. TORRE — *Cochlearia oblongifolia* DC.
Sedum Rhodiola DC. — *Saxifraga rivularis* L.

3 Heath-Associations

The heath-associations in this island are related to the drier type and mostly represented by the Empetretum. It is one of the most distinctive type of the vegetation developed on the flat upland on this island. It seems to be poor in number of the species than in the case of the other islands in the Middle Kuriles. Shrubs such as *Alnus fruticosa*, *Sorbus sambucifolia* and *Salix arctica*, var. occur in varying amount in the heath, but they are always subordinate to the dwarf-shrubs. *Empetrum nigrum* is the dominant species and is there associated with the following Ericaceous plants:—

Rhododendron chrysanthum PALL. — *Arctous alpina* NIEDENZ.
Loiseleuria procumbens DESV. — *Vaccinium Vitis-Idaea* L.
Vaccinium uliginosum L.

Accompanied with them are found such plants as:—

Calamagrostis purpurascens R. BR. — *Agrostis Trinii* TURCZ.
Lilium medeoloides A. GRAY. — *Orchis aristata* FISCH.
Polygonum viviparum L. — *Geum calthaefolium* SM.
Astragalus secundus DC. — *Oxytropis retusa* MATSUM.
Cornus suecica L. — *Pyrola minor* L.
Trientalis europaea L.

There is a wet type of the heath near Ainu-wan. It seems to be an inter-

mediate stage from the bog-association to the dry heath-association. The characteristics are as follows:—

Carex rariflora SMITH
Empetrum nigrum L.
Arctous alpina NIEDENZ.
Rubus chamaemorus L.
Vaccinium uliginosum L.

Accompanied with them, the following plants are found:—

Calamagrostis Langsdorffii TRIN.
Carex pyrenaica WAHLENB.
Tofieldia nutans WILLD.
Geum calthaefolium SM.
Loiseleuria procumbens DESV.
Agrostis Trinii TURCZ.
Carex hakonensis FRANCH.
Polygonum viviparum L.
Cornus suecica L.
Trientalis europaea L.

4 Grassy land-Association

Most of the communities in the lower slopes are occupied by this type of the vegetation and the master factor is the recent eruption. It is developed especially on gentle slopes or flat uplands, and the remarkable example is to be found near Miharashidai. *Calamagrostis Langsdorffii* is the dominant species, and here besides it are found the following plants:—

Phleum alpinum L.
Trisetum sibiricum RUPR.
Geranium erianthum DC.
Swertia tetrapetala PALL.
Euphrasia mollis WETTST.
Achiliea sibirica LEDEB.
Festuca rubra L.
Luzula Kjellmanniana MIYABE et KUDO
Gentiana auriculata PALL.
Halenia sibirica BORKH.
Achillea Ptarmica L.
Anaphalis margaritacea BENTH. et HOOK.

Carex Gmelini and *Carex scita* are mixed with them near the beach.

5 Herbaceous-Association

The associations of this type are commonly developed in hollows of the lowland, on hill-sides and along streams. They are only represented by the tall herbaceous community—*Filipendula-Senecio-Petasites*-association. They are found in more or less rich soils. *Filipendula kamtschatica* is the most prominent species, while *Senecio palmatus* and *Petasites japonicus*, var. are the chief

herbs. *Aconitum kamtschaticum* and *Cirsium kamtschaticum* maintain the subordinate rank. Besides them are found the following plants:—

Veratrum album L.
Urtica platyphylla WEDD.
Heracleum lanatum MICHX.
Saussrea Riederi HERD.
Artemisia vulgaris L.
Lilium medeoloides A. GRAY
Geranium erianthum DC.
Swertia tetapetala PALL.
Anaphalis margaritacea BENTH. et HOOK.

Along streams or in wet places, *Petasites japonicus* var. is dominant, associated with such plants as:—

Cardamine Regeliana MIQ.
Chrysosplenium kamtschaticum FISCH.
Epilobium Behringianum HAUSSKN.
Barbarea orthoceras DC.
Saxfraga punctata L.

6 Swamp and Bog-Associations

The swamp and bog-associations are not so well developed in this island, occurring only at Ainu-wan and near Nakadomari. They are composed almost entirely of *Carex Lyngbyei* and followed by the border of *Calamagrostis Langsdorffii*. *Carex rariflora* is locally prominent and the following plants have been found in the association:—

Equisetum palusre L.
Agrostis Trinii TURCZ.
Iris setosa PALL.
Hyppuris vulgaris L.
Deschampsia caespitosa P. BEAUV.
Carex hakonensis FRANCH.
Comarum palustre L.

Besides these are sometimes naticed such plants as follows:—

Carex pyrenaica WAHLENB.
Viola repens TURCZ.
Galium trifidum L.
Platanthera hyperborea LINDL.
Viola Langsdorffii FISCH.

7 Lapilli-slope-Association

The ground of the Lapilli-slope is composed of the lava fragments varying in size from large blocks to fine sands. The general feature of the vegetation is of the dry type. The data collected were not sufficient to enable us to make a complete survey of the association, especially on its alpine region. The most

characteristic species of the herbaceous plants are as follows :—

Deschampsia flexuosa TRIN.	*Agrostis Trinii* TURCZ.
Carex flavocuspis FR. et SAV.	*Oxyria digyna* HILL.
Stellaria ruscifolia WILLD.	*Papaver nudicaule* L.
Saxifraga Merkii FISCH.	*Oxytropis retusa* MATSUM.
Pentstemon frutescens LAMB.	*Campanula lasiocarpa* CHAM.

The pioneers of the association are *Papaver nudicaule*, *Stellaria ruscifolia*, *Saxifraga Merkii* and *Pentstemon frutescens*, and then *Oxytropis retusa* and *Campanula lasiocorpa*, and other species invade the region. In the limitted localities on the eastern side of Mt. Fuyô, are recorded such plants as, *Pentstemon frutescens*, *Carex flavocuspis*, *Oxytropis retusa*, etc.

Among the shrubby species the following plants are found in these associations.

Salix arctica PALL.	*Empetrum nigrum* L.
Rhododendron kamtschaticum PALL.	*Rhododendron chrysanthum* PALL.
Cassiope lycopodioides DON	*Arcteria nana* MAKINO

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摘　　要

松輪島は中部千島の北部を占め、植物分布上注目すべき島にして、**ヲンコ**、**フキ**等は此處を北限とす。植物群落としては比較的新しき火山よりなれることとて、種類の少なきと共に群落相も簡單なり。森林は**ミヤマハンノキ**林に依りて代表せられ、**ダケカンバ**、**ハイマツ**の影をみず。寒原(Heath)植物も種類少なく、唯**ガンカウラン**群落頗るよく發達せり。禾本科植物群落は**イハノガリヤス**群落に占められ、山麓並に臺地にはその純相を認む。火山礫地群落は隨所にこれを見、礫地お花畑を構成せり。著者の分割せる群落は次の七種なり。

1) 林地群落
2) 海濱群落
3) 寒原群落
4) 草原(禾本科植物)郡落
5) 草地群落
6) 沼澤濕原群落
7) 火山礫地群落