

# 11.

## Experiences with cultivation of plants from the southern hemisphere in West Norway compared with observations from Denmark and the Faroe Islands

Royndir í Vesturnoregi við gróðurseting av plantum frá sunnaru hálvu sammettar við royndir í Danmark og Føroyum

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### Abstract

Plant material collected in New Zealand/Australia and southern South America 1974/75, was grown in Tórshavn, Bergen and Copenhagen. Growth and survival were compared for a number of species at the three localities after they had been through cold winters (Table 1). Survival was found to be markedly better in Tórshavn than in Bergen and Copenhagen. Evergreen species such as *Athrotaxis cupressoides*, *Embothrium coccineum*, *Libocedrus bidwillii*, *Griselinia littoralis*, *Neopanax colensoi* and *Senecio bidwillii* have grown well in Tórshavn.

In Bergen and Copenhagen the same species were able to survive only the mildest winters. Differences in survival can best be explained by milder winters and shorter periods of continuous freezing in Tórshavn compared to Bergen and Copenhagen (Tables 2, 3, and 4). Species from other genera (e.g. *Aciphylla*, *Celmisia* and *Prostanthera*) are recommended for trial in the Faroe Islands.

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The 1985/86 winter was severe in West Norway and inflicted much damage to indigenous species such as juniper (*Juniperus communis*), heath and heather (*Erica tetralix*, *E. cinerea*, and *Calluna vulgaris*). It also resulted in a most efficient screening among exotic species in this part of Norway, particularly evergreens. In the 15 year long history of the Norwegian arboretum, Milde, near Bergen, the 85/86-winter is closely comparable to the 1978/79 winter which was rated among the coldest in West-Norway during the 20th century (Hjellestad 1985). Plants introduced by the Nordic arboreta from the southern hemisphere in 1974/75 have been under trial for about 10 years. Trial plantings initiated at Milde in 1977 were not sufficiently well established to resist the 1978/79 winter. It came as a knock out and very few plants were alive after the following cold and wet summer. New trials were laid out at Milde in the beginning of the 1980s. After the 1985/86 winter these trials indicate which species deserve further attention in West Norwegian horticulture or in the Norwegian climate zone 2, comprising the coastal and fiord areas of West- and South Norway (Hansen 1984).



11.1 "Aputræ" (*Araucaria araucana*) við prestagarðin í Lunde, Balestrand, Sogn í Noregi. Plantað í 1873. Hædd 19 m, vidd 84 cm.

Monkey puzzle, *Araucaria araucana*, at the Lunde vicarage, Balestrand, Sogn in Norway. Planted 1873, height = 19 m, diam. = 84 cm. July 1986, photo PS.

Before the introductions in 1974/75 the southern hemisphere flora was with few exceptions poorly represented in Nordic plant collections. The monkey puzzle, *Araucaria araucana*, was- and still is- one of the most conspicuous exceptions.

This South American species was introduced to western Norway in the middle of the 19th century (Søndergaard 1975). One of the oldest trees in Norway is found at Balestrand in Sogn, 120 km northeast of Bergen. It was planted in 1873 (Schübeler 1886) and had in 1986 obtained a height of 19 m and a diameter in breast height of 84 cm. Fig. 11.1.

Approximately 100 specimens of monkey puzzle have obtained tree- size in western Norway, from Stavanger in the south to Kristiansund in the north. The

female trees produce fertile seed with irregular intervals, and spontaneous regeneration has been observed below old trees. Consequently *Araucaria araucana* is well established in cultivation in West Norway. On the contrary, in Denmark and Sweden hardly any monkey puzzle did survive the extremely cold winters in the 1940s.

The antarctic beech, *Nothofagus antarctica*, is another South American species that has proved to be reliable in cultivation in the milder parts of Scandinavia. The oldest specimens in West Norway are about 30 years; a few have passed 10 m in height, and they are both healthy and vigorous.

A limited number of woody species from the southern hemisphere has been grown in the Botanical Garden at the University of Bergen. Most of the species did not survive the 1978/79 winter, e.g. *Olearia x haastii* which with a few interruptions, has been in cultivation for about 50 years. By sheer chance *Griselinia littoralis* survived and thrived for about 5 years before it was killed in 1978/79, while the small cushion plant, *Coprosma petriei*, refused to die even in 1978/79. In the Faroe Islands encouraging results have been obtained with the South American species *Embothrium coccineum* since it was introduced to the islands in 1965 (Ødum 1979).

These scattered and quite haphazard experiences suggested that the potentialities of the southern hemisphere flora were far from being exploited in Scandinavian collections of woody plants. The Nordic Arboretum Committee (established in 1972) gave high priority to new plant introductions from this part of the world and two seed collecting expeditions were arranged in 1974/75. One to New Zealand/Australia and another to southernmost South America (Nordisk Arboretutvalg 1977, Søndergaard et al. 1977., Ødum et al. 1977.). The two expeditions introduced a considerable amount of plant material to Scandinavia. This material was distributed for trials in the western parts of Scandinavia including the Faroe Islands, to where plants were sent in 1976/77 after having been propagated in the arboreta at Hørsholm, Denmark and at Milde, Norway. The following comparison of plants in the Faroes, West-Norway and Denmark is based on inventories made in August 1982 in Tórshavn, September 1985 in Copenhagen (Hørsholm and Charlottenlund), and June/July 1986 in Bergen (Milde) (revised 1988). The plants had been through very cold winters in all of the three areas. In Denmark the winters of 1981/82 and 1984/85 were among the coldest since 1900 (Rosenørn 1986). In Tórshavn the 1978/79 winter was the next coldest during the period 1966 – 1986 (Meteorologisk Institut 1986). At Milde the two winters 1978/79 and 1985/86 were the coldest since 1971, when the Norwegian Arboretum was established, and among the coldest in West-Norway since 1900 (Hjellestad 1985).

## Comparison of growth

The plants were grown under favourable conditions, with good shelter to the north and east, mostly in semi-shade and protected against early morning sun and stagnant cold air. No plants were covered during the winter.

Table 1. Evaluation of hardiness in plants from the southern hemisphere grown near Copenhagen (Denmark), Tórshavn (Faroe Isl.) and Bergen (Norway) between 1976 and 1986. Collected by the Nordic arboretum expeditions to New Zealand/Australia 1974/75 and to southern South America 1975 and 1979. Vurdering av hårdførhed i planter som har været dyrket nord for København (Danmark); Tórshavn (Færøerne) og Bergen (Norge) mellem 1976 og 1986. Samlet av de nordiske arboret-ekspeditioner til New Zealand/Australien 1974/75 og til det sydlige Sydamerika 1975 og 1979.

		Tórshavn	Bergen	Copenhagen
<i>Athrotaxis cupressoides</i>	TAS	++++ m	-	-
<i>Aristotelia fruticosa</i>	NZ	++ m	++ m	-
<i>Callistemon sieberi</i>	AU	++ w	-	-
<i>Cassinia vauvilliersii</i>	NZ	+++ s	++ s	-
<i>Chiliotrichum diffusum</i>	SA	++++ s	+ s	+ s
<i>Coprosma ciliata</i>	NZ	+++ w	-	-
- <i>pseudocuneata</i>	NZ	+++ w	++ s	-
- <i>rugosa</i>	NZ	++ m	+ m	-
<i>Dacrydium bidwillii</i>	NZ	++++ m	++ m	?
<i>Discaria toumatou</i>	NZ	++ w	+ m	?
<i>Drimys lanceolata</i>	AU	+++ m	+ m	?
<i>Embothrium coccineum</i>	SA	++++ s	-	-
<i>Eucalyptus coccifera</i>	TAS	+++ w	-	-
<i>Fuchsia magellanica</i>	SA	++ s	+ s	+
<i>Griselinia littoralis</i>	NZ	++ m	-	-
<i>Hebe buchananii</i>	NZ	+++ m	++ m	++ s
- <i>cockayneana</i>	NZ	++++ s	-	-
- <i>epacridea</i>	NZ	+++ m	-	?
- <i>hectori</i>	NZ	+++ m	+ w	?
- <i>odora</i>	NZ	++++ s	++ m	++ m
- <i>pauciramosa</i>	NZ	++++ m	++ m	+ w
- <i>sp.cf.rakaiensis</i>	NZ	++++ s	?	?
- <i>rupicola</i>	NZ	++++ s	++ m	?
- <i>subalpina</i>	NZ	+++ m	+ m	+ w
<i>Hoheria glabrata</i>	NZ	++ s	+ w	+ w
- <i>lyallii</i>	NZ	++ s	+ w	+ w
<i>Leptospermum humifusum</i>	TAS	++ m	+ w	?
<i>Libocedrus bidwillii</i>	NZ	+++ m	-	?
<i>Lomatia hirsuta</i>	SA	+++ m	-	-
<i>Neopanax colensoi</i>	NZ	++ w	-	?

All species included in table 1 have survived in Tórshavn, and most species have shown both good hardiness and growth.

Particularly outstanding are the south American species of *Nothofagus*, many species of *Hebe* from New Zealand and some single species e.g. *Athrotaxis cupressoides*, *Cassinia vauvilliersii*, *Chiliotrichum diffusum*, *Embothrium coccineum*, *Hoheria glabrata*, and *Libocedrus bidwillii*. They all seem to have adjusted well to Faroese conditions.

In Bergen two species of the southern beech, *Nothofagus antarctica* and *N. pumilio*, have adapted well. *Nothofagus antarctica* was introduced to West Norway in the 1950'es while *N. pumilio* was introduced via Denmark to the Norwegian Arboretum in 1977 (collected by Danish expeditions to South America in 1974/75 (Schlätzer 1976 and Ødum et al. 1977).

		Tórshavn	Bergen	Copenhagen
<i>Nothofagus antarctica</i>	SA	++++ s	++++ s	++++ m
- <i>betuloides</i>	SA	++++ s	++ m	-
- <i>cunninghamii</i>	TAS	++ w	-	-
- <i>menziesii</i>	NZ	++ w	-	-
- <i>pumilio</i>	SA	++++ s	+++ (+) s	+++ m
- <i>solandri v. cliff</i>	NZ	++ w	++ w	++ w
<i>Olearia ilicifolia</i>	NZ	++ w	+ w	-
- <i>moschata</i>	NZ	++++ w	-	-
- <i>nummulariifolia</i>	NZ	+++ w	-	-
<i>Orites lancifolia</i>	AU	+++ w	+ w	?
<i>Pernettya mucronata</i>	SA	+++ s	+ m	+ m
<i>Phormium cookianum</i>	NZ	+++ w	-	?
<i>Pittosporum bicolor</i>	NZ	++ w	-	?
- <i>rigidum</i>	NZ	++++ w	-	?
<i>Podocarpus acutifolius</i> x <i>P. nivalis</i>	NZ	++++ m	+++ m	+++ m
- <i>hallii</i>	NZ	++++ m	+++ m	+++ m
- <i>nivalis</i>	NZ	++++ m	+++ m	+++ m
<i>Senecio bidwillii</i>	NZ	+++ m	-	-

- ++++ Completely hardy or with insignificant damage. (Helt hårdføre eller med ubetydelige skader).
- +++ Frostdamage on leaves and/or shoot tips in cold winters. (Blade og/eller skud-spidser skadet i kolde vintre).
- ++ Plants strongly cut back by frost in cold winters, up to 2/3 of the aerial parts killed. (Stærk tilbagefrysning i kolde vintre, inntil 2/3 av plantens overjordiske dele ødelagt).
- + Plants cut down to the ground in cold winters, but regenerate from the base. (De overjordiske dele døde, men planten regenererer fra grunden).
- Plants killed in cold winters. (Planterne dør i kolde vintre).
- s = Strong and healthy growth (stærk og sund vekst).
- m = Middle growth and health (middel vekst og sundhed).
- w = Weak growth and health (svag vekst og sundhed).
- AUS = Australia (mainland).
- NZ = New Zealand
- SA = South America
- TAS = Tasmania

A trial planting of *N. pumilio* with 14 plants, established in Bergen 1977, gives an idea of the potentialities for this species in West Norway.

End of growing season	Average height cm	Average length of annual shoot cm
1977	appr. 30	
1982	( 60) 139 (200)	
1984		(20) 60 ( 95)
1985	(175) 307 (435)	(30) 71 (100)
1987	(235) 424 (565)	

The plants were severely damaged by the 1978/79 winter, two years after planting, while the 1985/86 winter only killed the outermost parts of last years growth. *Nothofagus pumilio* seems to be an equally promising tree in western- and southern Norway as *N. antarctica*. The foliage is handsomer, and *N. pumilio* apparently grows faster and bigger than *N. antarctica*. The evergreen *N. betuloides*, which has adapted so well in the Faroe Islands, does only survive under the most favourable conditions in Bergen, and even there it is cut back in cold winters (at least as a young tree). All plants raised in Bergen from the 1975 expedition were killed in 1978/79. Plants collected by The Danish Scientific Expedition to Patagonia and Tierra del Fuego in 1979 (Madsen et al. 1980) and planted in Bergen 1982 have done better in 1985/86, probably due to more favourable growing conditions. However, as far as can be seen at present, the birch leaved southern beech has got no bright future in West Norway. *Nothofagus antarctica* is the most reliable species of southern beech in Denmark, but the choice of provenance is important. *Nothofagus pumilio* seems to be less reliable in cultivation in Denmark than it is in Bergen, while *Nothofagus betuloides* apparently has got very few chances for survival in Denmark (Ødum 1979).

Among garden plants, species of *Hebe* have attracted special attention in the Faroe Islands. The most successful (e.g. *H. odora*, *H. cf. rakaiensis*, *H. rupicola*) are very luxuriant in growth. Some of the species sow themselves freely and the seedlings show an exceptional ability to resist frost lifting (pers. communication from Tróndur Leivsson 1985). This corresponds to observations in Bergen 1986/87.

But the situation is different in Bergen. Only under the most favourable conditions can some species of *Hebe* get through the coldest winters without being too damaged (e.g. *Hebe pinguifolia*, *H. buchananii*, *H. odora*, and *H. rupicola*). However, given the right treatment and with appropriate winter cover a fair number of *Hebe* species could be grown and give a lot of pleasure to Norwegian gardeners in climate zone 2. *Hebes* are easy to propagate by cuttings and they are fast growers, which makes it easy to keep a steady stock of small plants. Species of *Hebe* seem to have even bigger problems with survival in Denmark, and most species are killed in cold winters. *Hebe pinguifolia* has, as far as known, not been tried in Tórshavn. It has proved to be the hardiest species of *Hebe* both in Bergen and in Copenhagen and ought to be introduced to the Faroe Islands even if it is less attractive in growth form than most of the other *Hebe* species.

*Embothrium coccineum*, the Chilean fire bush, belongs together with *Neopanax colensoi*, *Senecio bidwillii*, *Griselinia littoralis* and *Libocedrus bidwillii* to a group of species, which most clearly demonstrate the differences in conditions of growth between the Faroe Islands and the rest of Scandinavia.

*Embothrium* has been in cultivation in Tórshavn since 1965. It has obtained considerable dimensions, flowers freely and produces fertile seed (Ødum 1979). In Denmark and Norway it has not been possible to keep this species alive outdoors for more than a few years. The same applies to *Neopanax colensoi*, *Senecio bidwillii*, *Griselinia littoralis*, and *Libocedrus bidwillii*. The species of *Podocarpus*

on the other hand have shown good survival in all of the three areas with relatively limited frost damage in sheltered positions. They are low – and slowgrowing plants, and most of them are well suited for the rock-garden. Inland provenances of *Podocarpus lawrencei* (syn. *P. alpina*) have proven good hardiness and growth in Bergen and Copenhagen, but have not yet been tried in Tórshavn.

## Comparison of climate data

The differences between the three areas in growth and development of plants are most likely explained mainly by differences in climate. A comparison of data between Bergen and Copenhagen (1931–1960) showed that mean temperatures during the period December – March were about 1–2°C higher in Bergen than in Copenhagen, and that the absolute minimum temperature measured in Bergen was about half of the figure in Copenhagen, – 13,5°C against – 24,2°C (Søndergaard 1972). These differences in mean temperatures and absolute temperatures are probably among the main reasons for a somewhat better wintering of southern hemisphere plants in Bergen than in Copenhagen.

*Table 2. Mean monthly temperatures Dec. – March in Tórshavn (Hoyvík) (Meteorologisk Institut, 1986), Bergen (Fana) (Det norske meteorologiske institutt 1986) and Denmark (country mean) (Rosenørn 1986) in some of the coldest winters during the period 1966 – 1986. Måneds middeltemperaturer dec. – marts i Tórshavn (Hoyvík) (Meteorologisk Institut, 1986), Bergen (Fana) (Det norske meteorologiske institutt 1986) og Danmark (landsgennemsnit) (Rosenørn 1986) i nogle af de koldeste vintre mellem 1966 og 1986 (°C).*

		Dec.	Jan.	Febr.	March
Tórshavn	1968/69	4,5	4,1	1,1	2,6
	1978/79	3,9	0,7	1,9	1,3
Bergen	1978/79	-1,5	-3,8	-3,4	4,1
	1985/86	0,6	-3,1	-4,8	3,5
Denmark	1981/82	-4,0	-3,6	-0,7	3,3
	1984/85	2,7	-5,0	-4,3	1,0

The figures in table 2 show that Faroese winters are different from those of West Norway and Denmark. Even the coldest winters in Tórshavn have got mean monthly temperatures well above 0°C

Extended periods with daily temperatures constantly below zero are rather common during cold winters in Bergen, but very rare in Tórshavn, table 3.

Finally, sums of absolute daily minimum temperatures, December – March, have been compared for Bergen and Tórshavn in table 4.

This is an unconventional figure, and should be taken only as additional illustration of the marked difference in temperature climate between Bergen on the northwestern outskirts of continental Europe and the Faroe Islands.

Table 3. Periods of more than two days with daily maximum temperatures below 0°C. Compared for Bergen (Det norske meteorologiske institutt 1986) and Tórshavn (Meteorologisk Institut 1986). Perioder af mere end to dages varighed med daglige maksimumstemperaturer under 0°C. Sammenlignet for Bergen (Det norske meteorologiske institutt 1986) og Tórshavn (Meteorologisk Institut 1986).

			Mean temperature during period °C
Bergen 1978/79	24.12–02.10	9 days	-8,2
	20.01–28.01	9 days	-5,3
	08.02–17.02	10 days	-8,5
Bergen 1985/86	06.12–09.12	4 days	-4,6
	26.12–09.01	15 days	-7,3
	15.01–17.01	3 days	-4,0
	25.01–27.01	3 days	-4,7
	31.01–09.02	10 days	-6,1
	13.02–27.02	15 days	-5,2*
Tórshavn 1968/69	31.01–02.02	3 days	-3,4
	06.02–08.02	3 days	-4,9
	06.03–11.03	6 days	-4,2
Tórshavn 1978/79	31.01–02.02	3 days	-3,1

\* 8 days with maximum temperatures just above 0°C.

Table 4. Sums of absolute daily minimum temperatures Dec. – March for two “very” cold winters in Bergen (Det norske meteorologiske institutt 1986) and Tórshavn (Meteorologisk Institut 1986). Summer af absolutte daglige minimumstemperaturer, december-marts, sammenlignet for to meget kolde vintre i Bergen (Det norske meteorologiske institutt 1986) og Tórshavn (Meteorologisk Institut 1986).

Bergen	1978/79 – 601,6	Tórshavn	1968/69 – 167,1
	1985/86 – 526,6		1978/79 – 161,8

The very short periods of continuous freezing imply that the Faroese soils never freeze in depth as they do in Norway and Denmark. In both 1978/79 and 1985/86 the soil was frozen to a depth of more than one meter in the Norwegian Arboretum. Consequently the plants in Tórshavn are never cut off from water in the soil, as they can be in Bergen and Copenhagen. This is no doubt what best explains the excellent survival of south hemisphere plants, and particularly evergreens, in Tórshavn.

### Other plants for Faroese gardens

Promising results have been obtained in Bergen with a few species, which are not included in table 2, and which have not, as far as known, been tried in Tórshavn.





*Loðpíllur í urtagarði í  
Skræddaragötu,  
Tórshavn.  
Salix lanata in a garden  
in Tórshavn. Photo T.  
Leivsson, 1988.*



*Ylliniviður í blóma,  
Landavegur 26,  
Tórshavn.  
Sambucus nigra  
flowering in Tórshavn.  
Photo S. Rasmussen,  
Aug. 1988.*



Royniviður við berum, Jóhannesar Páturssonargöta 26, Tórshavn.  
*Sorbus mougeottii* in a garden in Tórshavn. Photo T. i Hoyvik, Oct. 1988.



Fúlvdáksin alhorntrøð, Tinghúsvøgur 4 (Anton Degns hús).  
*Acer pseudoplatanus* in a garden in Tórshavn. Photo T. i Hoyvik, Oct. 1982.



11.2. *Prostanthera cuneata*, óskalað eftir veturin 1985/86. Úr urtagarði hövundsins.  
*Prostanthera cuneata*, undamaged after the 1985/86 winter. From the author's garden. July 1986, photo PS.

Some plants of *Prostanthera cuneata*, from Mt.Kosciusko in the Australian Alps, did survive the 1985/86 winter surprizingly well, in some cases with no damage at all. But shelter from north- and east winds and protection against stagnant cold air and morning sun were essential for survival. (e.g. plants exposed to morning sun were killed without exception) Fig. 11.2. *Coprosma nitida* from Tasmania has not been tried in Tórshavn. It is cut back by cold winters in Bergen, but regenerates from the base. *Coprosma nitida* would probably do much better in Tórshavn than in Bergen.

During the expedition to New Zealand, several hybrids of the genus *Olearia* were collected, e.g. *O. x ilicifolia* and *O. x moschata*. Two plants supposed to be hybrids between *O. moschata* and *O. nummulariifolia* have survived the 1985/86 winter in Bergen with hardly any damage (again under favourable conditions), while only one plant of hybrids, supposed to be *O. moschata* x *O. ilicifolia*, has survived after being cut down to the ground by frost. Fig. 11.3. The two *Olearia* hybrids certainly deserve to be tried in Tórshavn. Both are characterized by an attractive silvery grey foliage, particularly nice in the holly-leaved *O. moschata* x *O. ilicifolia*.

The genus *Celmisia* contains a number of woody dwarf shrubs. Among those a few have been tried in Bergen, and only *C. angustifolia* has survived the cold winters. It does survive but is not easy to grow. *Celmisia incana* survived 3 winters



11.3. *Olearia x* (cf. *moschata x nummularifolia*) óskalað eftir veturinn 1985/86. Milde, Noreg. *Olearia x* (cf. *moschata x nummularifolia*), undamaged after the 1985/86 winter, Milde, July 1986, photo PS.

but died in 1985/86. *Celmisia* is also an interesting genus for Tórshavn where, in addition to the above mentioned, species like *C. viscosa*, *C. walkeri* and *C. brevifolia* should be tried. Many of the herbaceous species of *Celmisia* should also find proper conditions for growth in Tórshavn, e.g. *C. coreacea*, a beautiful plant which survives normal winters in Bergen, and *C. spectabilis*, another attractive New Zealand daisy which has been grown in the Bergen Botanical Garden, but so far without being able to cope with very cold winters.

An antipodal curiosity is the herbaceous genus *Aciphylla*, Fig. 11.4. Many of its species are attractive and quite a few have been tried with promising results in the author's garden (in Bergen). *Aciphylla glaucescens* is particularly recommendable. Six year old plants produced seed in 1985, and about 30 seedlings will hopefully assure the future cultivation of this species in Bergen. One specimen of *A. kirkii* has survived the 85/86 winter without any injury at all and is flowering in 1986, but alas, it is a male plant. However, it may have contributed to hybrids with neighbouring female plants of *A. pinnatifida*. *A. pinnatifida* is spreading by suckers and is a beautiful small foliage plant. A single female plant of *Aciphylla glacialis* has been flowering every year during the last three years, and is now forming a bunch

11.4. *Aciphylla kirkii* í urtagarði  
høvundsins, Blomsterdalen.  
*Aciphylla kirkii* in the author's  
garden. July 1986, photo PS.



of rosettes that probably can be divided into a number of new plants. *Aciphylla glaucescens* also continued to grow after flowering in 1985 and has produced new rosettes from the base of the flowering stems. The same has happened with *A. kirkii*, which hopefully can be multiplied by division. *Aciphylla aurea* has been grown both in Bergen and in Tórshavn. Consequently, at least 5 species of this intriguing genus should be potential garden plants for both West Norwegian and Faroese gardens.

### Concluding remarks

The cool and humid climate that characterizes both West Norway and the Faroe Islands is apparently favouring many plants, but it also sets narrow limits for heat-demanding plants. (e.g. *Robinia pseudacacia*, the locust, that thrives well in Denmark, does not get sufficient heat in Bergen to terminate its yearly growth and is constantly cut back by frost).

In Bergen this is a problem with many other species from a continental type of climate and certainly more so in the Faroe Islands. It is not surprising that plants

from the typical oceanic climates of Australia, New Zealand and southern South America should be able to adjust to the oceanic climates in Scandinavia. What really surprises is that so many species from those parts of the world seem to adjust so well in the Faroe Islands. In addition to being moved from nearly the opposite side of the globe, many of the species have been displaced in latitude by as much as 20° closer to the pole.

Results with southern hemisphere plants in Bergen could seem discouraging. But it must be taken into consideration, that the gene pools of potential interest have just only been touched by the Nordic Arboretum expeditions to the southern hemisphere. The results from these general and exploratory expeditions should be studied carefully and followed up by more specific collecting, aiming at species and areas which have shown to be of particular promise. By following this procedure it should be possible to locate material with increased hardiness and thereby to provide milder areas of "continental" Scandinavia with a better choice of plants from the southern hemisphere.

Nomenclature is in accordance with Allan's Flora of New Zealand vol. 1. (1). Burbridge and Gray's Flora of the A.C.T. (2). Curtis' The Students Flora of Tasmania (3) and with Ødum, Hjerting and Søgaard 1977 (15).

## Dansk resumé

### Dyrkningsresultater med planter fra den sydlige halvkugle i Vestnorge sammenholdt med iagttagelser fra Danmark og Færøerne

Efter de nordiske arboretets indsamlingsekspeditioner til New Zealand og det sydlige Sydamerika i 1974/75 har både Danmark, Færøerne og Vestnorge oplevet meget kolde vintre (tabel 2, 3 og 4).

Dette har resulteret i en effektiv sortering i det hjembragte plantemateriale, som har været i dyrkning i Norden i ca. 10 år.

Den sydlige halvkugles flora var indtil 1975 meget sparsomt repræsenteret i nordiske plantesamlinger på friland. En iøjnefaldende undtagelse er Abetræet, *Araucaria araucana*, som har været dyrket i Vestnorge siden midten af det 19. århundrede. Fra Stavanger i syd til Kristiansund i nord findes der omkring 100 små og store træer af denne art. Andre mere eller mindre tilfældige erfaringer med planter fra den sydlige halvkugle, tydede på at der var muligheder for at dyrke et større udvalg af planter fra disse områder. Dette var baggrunden for de nordiske arboretets indsamlingsekspeditioner til New Zealand/Australien og det sydlige Sydamerika (13, 14, 15). Den vurdering af en del arters hårdførhed og vækst, som er vist i tabel 1, blev foretaget i Bergen i sommeren 1986 efter en lang og hård vinter 1985/86 (justeret i 1988). I Danmark blev materialet beskrevet i efteråret 1985 efter den meget hårde vinter 1984/85 (justeret i 1988), mens vurderingen på Færøerne er fra 1982, hvor den nærmeste "rigtig" kolde vinter var 1978/79. Tabel 1 viser at der er en udpræget forskel i planternes overlevelse og vækst mellem Torshavn på den ene side og Bergen og København på den anden. Arter som *Embothrium coccineum*, *Libocedrus bidwillii*, *Griselinia littoralis*, *Neopanax colensoi* og *Senecio bidwillii* har klaret sig godt i Torshavn, mens de i Bergen og København kun kan overleve de aller mildeste vintre på friland.

Disse forskelle i dyrkningsmuligheder forklares bedst ved forskellene i vinterklima mellem de tre områder (tabel 2, 3, og 4). Især er varigheden af perioder med konstant frost afgørende. På Færøerne er sådanne perioder meget korte, hvilket igen betyder at frosten aldrig trænger dybt ned i jorden. Derimod er der i Vestnorge og Danmark ofte lange perioder med vedvarende streng kulde, og jorden kan fryse mere end en meter i dybden.

Blandt sydbøgene er Antarktisk Sydbøg, *Nothofagus antarctica*, den mest hårdføre og dyrkningssikre i alle tre områder. *Nothofagus pumilio* viser en meget lovende udvikling på Færøerne og i Vestnorge, mens dens udvikling i Danmark tilsyneladende er afhængig af rigtigt proveniensvalg (16). Den stedsegrønne *Notho-*

*fagus betuloides* trives godt på Færøerne, mens den har store problemer i Vestnorge og nærmest må afskrives til dyrkning på friland i Danmark.

*Podocarpus* arterne overvintrer stort set godt i både Bergen, København og Torshavn. I Bergen er der fundet tydelige proveniensforskelle indenfor den australske *Podocarpus lawrencei* (syn. *P. alpina*). En kystproveniens fra Mt. Wellington på Tasmanien har vist sig mindre hårdfør end indlandsprovenienser fra Tasmanien og Mt. Kosciusko i de Australske Alper. *Podocarpus lawrencei* bør også prøves i dyrkning på Færøerne.

Af vedplanter i kurvplantefamilien har *Olearia x haastii* været dyrket i Botanisk Have i Bergen siden 1931. Den har i perioder opnået anselige dimensioner, men døde i de hårde vintre i 1940'erne og senere i begyndelsen af 1960'erne og i 1978/79. En anden *Olearia* hybrid, *O. cf. (moschata x nummulariifolia)*, har under beskyttede vokseforhold overlevet 1985/86 vinteren i Bergen helt uskadt, mens hybrider mellem *Olearia ilicifolia* og *O. moschata* døde eller frøs helt ned. Begge disse krydsninger er attraktive planter med sølvgrå blade; de fortjener at blive prøvet på Færøerne. *Chiliotrichum diffusum* fryser langt tilbage i kolde vintre, både i Vestnorge og i Danmark. Men den dør ikke og regenererer hurtigt og frodigt, næsten som malurt. *Chiliotrichum* har tilsyneladende ikke problemer selv i kolde færøske vintre.

I Bergen er der også opnået interessante resultater med den læbeblomstrede *Prostanthera cuneata*, som blev samlet på Mt. Kosciusko i 1.900 m højde. Nogle planter, som har vokset i halvskygge og beskyttet mod vind fra nord og øst og tidlig sol, har ikke antydninger af frostskafer, mens frit eksponerede planter døde. Arten har attraktivt dybtgrønt bladværk og store hvide, sommerfuglelignende blomster med blå og gule tegninger. Den blomstrer i juli og er også blandt de arter som burde prøves på Færøerne.

Alle planter som er sammenlignet i tabel 1 har været dyrket under meget beskyttede forhold, i læ mod nord og øst, beskyttet mod tidlig morgensol og i områder, hvor der ikke var stagnerende kold luft. Og ingen af planterne har været dækket om vinteren.

Arter inden for slægten *Celmisia* kunne være interessante for havebruget på Færøerne, både de vedagtige, som f.eks. *C. angustifolia* og *C. incana*, og de urteagtige hvor specielt *C. coriacea* kan anbefales. Skærmpanteslægten, *Aciphylla*, er en af rariteterne fra New Zealand og Australien. Mange af dens arter er både morsomme og attraktive og skulle have gode muligheder som haveplanter på Færøerne, f.eks. *Aciphylla glaucescens*, *A. kirkii*, *A. pinnatifida*, *A. glacialis* og *A. aurea*.

Resultaterne med dyrkning af planter fra den sydlige halvkugle i Bergen kan virke beskedne. Men de nordiske ekspeditioner har – trods ihærdige anstrengelser – kun berørt en meget begrænset del af genpotentiallet i indsamlingsområderne. Resultaterne af disse bredt anlagte ekspeditioner bør derfor studeres nærmere og senere følges op med specifikke indsamlinger, dels af arter – og dels i områder som har vist sig at være specielt lovende. På denne måde skulle der være chancer for at



opspre plantemateriale med større hårdførhed end det som hidtil er indført. I så fald kunne også de »kontinentale« områder af Skandinavien få et godt udvalg af have- og landskabsplanter fra den sydlige halvkugle.

## Føroyskt úrtak

Plantur, sum vórðu innsavnaðar í New Zealandi, í Australiu og sunnasta parti av Suður-Amerika í 1974/75, hava verið royndar í Tórshavn, Bergen og Keypmannahavn. Vøxtur og evnini hjá fleiri plantusløgum at koma livandi gjøgnum teir køldu vetrarnar hesi trý støðini vórðu kannað. (Talva 1). Tað vísti seg, at planturnar í Tórshavn komu nógv betur gjøgnum vetrarnar, av tí at vetrarnir ikki vóru so kaldir í Tórshavn sum í Bergen og Keypmannahavn. Vetrargrøn plantusløg sum t.d. *Athrotaxis cupressoides*, *Embothrium coccineum*, *Libocedrus bidwillii*, *Griselinia littoralis*, *Neopanax colensoi* og *Senecio bidwillii* vaksa væl í Tórshavn. Í Bergen og Keypmannahavn kundu hesi somu sløg einans tola teir vetrar, ið vóru lýggir. Tað, at føroyski veturin er lýggjari og hevur færri frostdagar, má sostatt sigast at vera orsøkin til munin millum plantutrivnaðin í Tórshavn, samanbórið við Bergen og Keypmannahavn. (Talvur 2,3 og 4). Tað verður skotið upp, at onnur plantusløg verða roynd í Føroyum, t.d. *Aciphylla*, *Celmisia* og *Prostanthera*.

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