Project Title:	**Vine Weevil: Phytotoxicity screening of suSCon Green in different growing media**	
Report:	**Final Report**	
Project Number:	**HNS 15b**	
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PRACTICAL SECTION FOR GROWERS

Objectives and background

The withdrawal of Aldrin in 1989 left container nursery stock extremely vulnerable to vine weevil, which in the absence of suitable alternatives built up to levels causing major problems for the industry. An intensive programme of work funded by MAFF and the HDC has investigated replacement materials for control of the larvae. A major part of this work has been done by ADAS, and under project HNS 15a, the potential of suSCon Green in peat based mixes was demonstrated. Two years phytotoxicity screening work, funded by Crop Care at HRI Efford, again in peat based mixes, indicated that there could be some species sensitivity to suSCon Green incorporation, albeit at rates considerably higher than those now recommended. *Elaeagnus ebbingei* appeared particularly sensitive, with progressive reduction in growth occurring as rates increased to 3.0kg/m^3. *Cotoneaster* 'Cornubia' was less affected, but some reduction in growth occurred at rates above 1.0kg/m^3. Since this rate was only 25% above the proposed recommendations, and could occur with uneven mixing, it was felt important that phytotoxicity work be continued across a wider range of species.

At the same time there was increased interest in production in peat free mixes, arising from the environmental lobby, with the question as to whether chemicals would respond in a similar manner in different substrates. This led to this project looking at the safety of suSCon Green use over a range of shrub, herbaceous and alpine species in different growing media identified as promising candidates from the 'Alternatives to Peat project HNS 28b. Efficacy work on suSCon Green continued with ADAS under HNS 15c, using the same range of treatments as the phytotoxicity programme (HNS 15b).

Project HNS 15b continued over two years (1992/3, 1993/4) and screened safety of suSCon Green for use with 14 hardy nursery stock, 5 herbaceous and 5 alpine species, keeping some species common to both years. Media used included woodfibre/bark/vermiculite, mixed conifer bark, coir on its own and in combination with different proportions of peat, with peat and peat:granulated pine bark controls. suSCon Green was incorporated at four rates; nil, 1.0, 1.25 and 1.5kg/m^3. The lowest rate was slightly higher than the current recommendations for peat (750g/m^3), though was at the recommended rate for the peat:bark mix (1.0kg/m^3). The sensitive indicator species, *Elaeagnus ebbingei,* was used across all treatments, with other species included in the peat, peat:bark and coir mixes only.

Rooted cuttings from Efford clonal stock, or bought in plugs or root divisions, were potted initially in 90mm or 2 litre pots in spring, with the 90mm plants potted-on into 3 litre containers the following summer. Base dressings varied according to mix, those with bark or coir in the mix requiring supplementary nitrogen additions to counteract lock up. All mixes incorporated Osmocote Plus 12-14 months Spring and magnesian limestone appropriate to species. Following early establishment under cold glass, the trial was grown on outdoor drained sand beds with overhead irrigation from early June.

Results

Results from the two seasons showed that both growing media and suSCon Green could have a major influence on quality of growth, with severity of symptoms dependant on rate of suSCon Green in combination with type of growing media used.

Growing media : The full range was only used with *Elaeagnus ebbingei.* The inclusion of a mixed conifer bark in Year 1 gave major problems in irrigation management, since the mix was so open and growth suffered. This was improved in Year 2 by the addition of 50% peat with the mixed conifer bark to improve its water retention properties and this mix produced some of the best growth in this season. Results with the woodfibre/bark/vermiculite substrate varied with season, with poor results in Year 1, but good results in Year 2. This could also be related to improved water holding properties in the second season. In the second year a 70:30 peat:rockwool mix was included, and this produced similar results to peat.

As observed in other trials, the standard 75:25 peat:pine bark mix still produces the best results overall, closely followed by peat. Results in coir were variable, with the Ericaceous/Calcifuge group growing poorly in this mix, along with several shrubs. Coir produced good results with Herbaceous and the Alpine species in the trials. Coir has a higher pH than peat, and although lime rates were adjusted, the pH could still have been on the high side for some groups of shrubs. On the other hand, Herbaceous and Alpine species included in this work prefer a higher pH, doing better in the coir. There is also the problem of management in the coir, especially over winter and in wet conditions when excessive leaching can occur. Growth in coir was improved by mixing with peat, particularly at 50% and above.

suSCon Green : There was a degree of sensitivity to this insecticide, but mainly at above recommended rates, with the majority of species showing little sign of damage at the rate of 1.0kg/m^3. This 'low' rate was used as the standard throughout the trial, and while it was 25% higher than recommended for peat, it was the recommended rate for mixes with bark or coir present. In addition, uneven mixing could easily distribute more of the chemical into one pot than another, so it was felt important to check response to this rate even in a peat mix. Where there was a measurable reduction in top or root growth at the 1.0kg/m^3 rate, it was not generally considered to be commercially significant.

Species sensitive to the higher rates included evergreen *Azalea, Elaeagnus x ebbingei, Erica carnea, Hypericum* 'Hidcote', *Bergenia, Dianthus, Heuchera, Hosta and Phlox*, where some top and root growth suppression was noted; *Viburnum tinus and Astilbe* with a small reduction in top growth and *Ceanothus* 'Autumnal Blue' and *Pyracantha* where root growth was reduced.

However, there was evidence with a number of species of an interaction between the growing media and suSCon Green, adverse effects of suSCon Green being more severe in one mix than another. The safest mix was undoubtedly peat:pine bark, where minimal damage occurred even as rates increased above 1.0kg/m^3. Plants grown in peat appeared more sensitive to increasing rates of suSCon Green than those in peat:pine bark, while this sensitivity increased still further in coir, where greater damage

occurred to increasing rates of suSCon Green. It was only possible to include a relatively limited range of species in this work and further information on a wider number of species is required. The safety 'buffer' that the pine bark appeared to give against increasing rate of suSCon Green is a major advantage and confirms results seen in earlier work. This safety factor is also important in the need to use a higher rate of 1.0kg/m^3 in a mix incorporating bark to achieve effective control of the vine weevil larvae, compared to the 750g/m^3 recommendation for peat. Conversely, coir also appears to require the higher rate to provide full control, but this increases the risk of damage.

While use of suSCon Green did affect top growth to some degree, depending on species, its influence was more marked on root development. A 10-20% reduction on a well rooted plant would not be serious, but could have major implications on weaker rooting species, especially on 'shelf life' after sale.end even subsequent establishment in the soil.

With *Rhododendron (and Azalea),* an effect observed on the root ball was the apparent avoidance by roots of the area immediately around the suSCon Green granules, creating a 'halo' effect. This did not appear to cause any further loss of root or root damage over the season, and did not have any obvious effect on plant growth. Similar 'halos' have been reported on these crops in nurseries.

A natural infestation of vine weevil occurred in the second year, with egg laying adults particularly attracted to *Sedum* and Mossy Saxafrage. Here the majority of untreated pots were gradually killed out by larvae activity due to the large numbers present. In one 2 litre container of *Sedum* 153 larvae were recovered! However, while the majority of larvae were found in the untreated pots, some were also present in those with suSCon Green incorporated, though in much smaller numbers. These were mostly confined to the original plug site which had been used as the start material, and which did not have suSCon Green present. This underlines the importance of protecting plants at each stage of growth including propagation, and project HNS 15e follows on from this one to look at the safety of using suSCon Green during this critical stage.

In summary, recommended rates of suSCon Green have proved safe for a range of shrub, herbaceous and alpine species, including those considered sensitive, though higher than recommended rates caused some phytoxicity in sensitive species. Response to suSCon Green varied with growing media, with its safety of use increased by the addition of 25% granulated pine bark with peat. Adverse effects of suSCon Green were greater in coir mixes, with peat intermediate between the two. Performance in coir was improved by the addition of peat.

Results on the control of vine weevil larvae in the different media in response to rate of suSCon Green incorporated is reported in project HNS 15c.

Action Points

SuSCon Green is now widely used in the industry for protection of container HNS against vine weevil. Points to be aware of include:

- The need to protect all stages of growth to prevent damage in an unprotected core of media potted on from a previous stage of production. This will be particularly important at the plug and liner stage where damage from a relatively small number of larvae can be very damaging.

- Identify species that could be sensitive to suSCon Green.

With sensitive species consider growing in a 75% peat: 25% pine bark mix, since pine bark appears to improve the safety of using suSCon Green.

Practical and financial benefits from the study

Adequate protection against vine weevil is essential, and in the 5 years since the withdrawal of Aldrin, numbers of larvae found in container grown stock increased rapidly. However, market demand is for larvae free plants, so not only is there the danger of serious damage from feeding larvae, but also the risk of consignments being rejected if larvae are visible. Consequently the financial benefit from ensuring vine weevil free containers is considerable.

The work has demonstrated the relative safety of use of suSCon Green at recommended rates, identified a number of species likely to be more sensitive to the chemical, and shown that its safety of use, particularly for the sensitive species, can be improved by careful choice of growing media.

This area of work has proved to be important in helping provide information for registration purposes.

EXPERIMENTAL SECTION

INTRODUCTION

The withdrawal of Aldrin in 1989 left container nursery stock extremely vulnerable to vine weevil, which in the absence of suitable alternatives built up to levels causing major problems for the industry. An intensive programme of work funded by MAFF and HDC has investigated replacement materials for control of the larvae. A major part of this work has been done by ADAS, and under project HNS15a, the potential of suSCon Green in peat based mixes was demonstrated. Two years phytotoxicity screening work, funded by Incitec International (now Crop Care) at HRI Efford, again in peat based mixes, indicated that there could be some species sensitivity to suSCon Green incorporation in the mix, albeit at rates considerably higher than those now recommended. *Elaeagnus ebbingei* appeared particularly sensitive, with progressive reduction in growth occurring as rates increased to 3.0 kg/m^3. *Cotoneaster* 'Cornubia' was less affected, but some reduction in growth occurred at rates above 1.0 kg/m^3. Since this rate was only 25% above the proposed recommendation, and could occur with uneven mixing, it was felt important that phytotoxicity work be continued across a wider range of species.

At the same time there was increased interest in production in peat free mixes, arising from the environmental lobby, with the question as to whether chemicals would respond in a similar manner in different substrates. This led to this project looking at safety of suSCon Green use over a range of shrub, herbaceous and alpine species in different growing media identified as promising candidates from the 'Alternatives to Peat' project HNS28b. Efficacy work on suSCon Green continued with ADAS under HNS15c, using the same range of treatments as the phytotoxicity programme.

Project HNS15b continued over two years (1992/3, 1993/4) and screened the safety of use of suSCon Green in different media with 14 hardy nursery stock, 5 herbaceous and 5 alpine species, keeping some species common to both years. The project was originally designed for 'three' years, but due to the importance of protecting all stage of growth, as identified in HNS15b, the third year was switched to look at safety of incorporating suSCon Green in the plug stage during propagation. This is reported in HNS15e.

suSCon Green was incorporated at four rates, ranging from Nil through to 1.5 kg/m^3. The lowest rate was slightly higher than the current recommendation for peat (750g m^3), through was at the recommended rate for the peat:bark mix (1.0 kg/m^3). The sensitive indicator species, *Elaeagnus ebbingei*, was used in all 8/9 media, with other species included in the peat, peat:bark and 100% coir mixes only.

Objectives: To examine the safety of incorporation of suSCon Green in different growing media for a range of shrub, herbaceous and alpine species.

MATERIALS AND METHODS

Site

All plants were grown outside on drained sand beds with overhead irrigation.

Treatments

Rate of suSCon Green incorporation: Nil
1.0 kg/m^3
1.25 kg/m^3
1.5 kg/m^3

Growing Media

for *Elaeagnus ebbingei:*
Woodfibre/Bark (Camlands)
100% Mixed Conifer Bark (Melcourt) – *Year 1*
50% Mixed Conifer Bark:50% Peat – *Year 2*
75% Shamrock Irish Peat:25% Pine Bark (Cambark 100)
100% Coir (Wessex)
75% Coir:25% Shamrock Irish Peat
50% Coir:50% Shamrock Irish Peat
25% Coir:75% Shamrock Irish Peat
100% Shamrock Irish Peat
70% Peat:30% Rockwool (Grodan) – *Year 2 only*

all other species:
75% Shamrock Irish Peat:25% Pine Bark (Cambark 100)
100% Coir (Wessex)
100% Shamrock Irish Peat

All mixes had 10% 6mm lime free grit included.

Species:	Year 1 (1992/93)	Year 2 (1993/94)
HNS	**Elaeagnus ebbingei*	**Elaeagnus ebbingei*
	**Japanese *Azalea* 'Rosebud'	** Japanese *Azalea* 'Blue Danube'
	***Erica carnea* 'King George'	***Calluna vulgaris* 'Firefly'
	**Ceanothus* 'Autumnal Blue'	***Erica carnea* 'Myretoun Ruby'
	Potentilla fruticosa 'Tangerine'	*Cotoneaster* 'Cornubia'
	Pyracantha 'Orange Glow'	*Hypericum* 'Hidcote'
	Viburnum tinus	*Potentilla fruticosa* 'Tangerine'
	**Chamaecyparis lawsoniana* 'Stardust'	**Chamaecyparis lawsoniana* 'Ellwoods Gold'
		Rhododendron 'Ginny Gee' *(observation in Peat mix only)*

	Year 1 (1992/93)	Year 2 (1993/94)
Herbaceous	*Astilbe* 'Joe Ophurst'	*Phlox subulata* 'Red Wing'
	Bergenia 'Sunningdale'	*Dianthus* 'Waithman Jubilee'
	Heuchera 'Palace Purple'	*Sedum* 'Autumn Joy'
	Hosta 'Honey Bells'	
Alpines		Variegated *Aubretia*
		Arabis
		Mossy Saxifrage 'Stansfeldii'

Base Dressings (kg/m^3)

These varied according to species and mix.

**Calcifuge HNS*	Osmocote Plus 12-14 months Spring		Magnesian Lime	Kieserite	Nitram
	Liners	3 litre†			
Woodfibre/Bark	3.5	5.0	Nil	1.2	0.50
Mixed Conifer Bark	3.5	5.0	0.75	-	1.20
50% Mixed Conifer Bark:50% Peat	3.5	5.0	0.50	0.50	0.60
75% Peat:25%	3.5	5.0	1.00	-	0.25
100% Coir	3.5	5.0	Nil	1.00	0.50
75% Coir;25% Peat	3.5	5.0	Nil	1.00	0.375
50% Coir:50% Peat	3.5	5.0	Nil	1.00	0.25
25% Coir:75% Peat	3.5	5.0	0.50	0.50	0.125
100% Peat	3.5	5.0	1.00	-	-
70% Peat:30% Rockwool	3.5	5.0	1.00	-	-

† Rate increased to 6 kg/m^3 for *Elaeagnus*

***Ericaeous HNS*: As calcifuge mixes but Osmocote Plus 12-14 months Spring reduced to 2.5 kg/m^3 in 90 mm pots, 3.5 kg/m^3 in 3 litre containers (*Azalea*), 2.0 kg/m^3 Autumn formulation (*Rhododendron* 'Ginny Gee'). In addition, rates of Nitram were halved. Heathers remained in the 90 mm pots for the duration of the trial.

General HNS: As calcifuge mixes but Magnesian Lime/Kieserite additives increased :

75% Peat:25% Pine Bark : 1.5 kg/m^3 Mg Lime
100% Coir : 0.5 kg/m^3 Mg Lime + 0.5 kg/m^3 Kieserite
100% Shamrock Irish Peat : 1.5 kg/m^3 Mg Lime

Herbaceous: Potted direct into 2 or 3 litre containers with 3.5 kg/m^3 Osmocote Plus 12–14 months Spring, 2.4 kg/m^3 Mg Lime, Nitram as Calcifuge HNS.

Alpines: Potted direct into 90 mm pots with 2.5 kg/m^3 Osmocote Plus 12–14 months Spring, 1.5 kg/m^3 Mg Lime, Nitram as Calcifuge HNS.

Design:

Randomised block design with 3 replicates except *Rhododendron* 'Ginny Gee' which was an unreplicated observation

Plot Size: 5 recorded plants/plot with 2 guards, one at each end of plot (see plans in Appendix 1).

General Culture

Year 1

HNS: Cuttings from Efford clonal stock were rooted in the late summer/autumn/winter of 1991, under mist or low polythene covers as appropriate, in PG 77 modular trays (50 ml cell volume), in a 50:50 peat:pine bark mix with 0.5 kg/m^3 Osmocote Mini 5-6 months incorporated.

Heathers were rooted in 15 ml cells in PG 273 trays in straight peat.

Rooted cuttings were potted into 90 mm pots March 1992, and potted-on into 3 litre containers in July 1992 (apart from Heathers which remained in the 90 mm pots throughout).

Herbaceous: Root divisions bought in from Howard and Kooij and potted direct into 3 litre containers March 1992.

Year 2

HNS: Cuttings, as Year 1, rooted from Efford clonal stock over the late summer/autumn/winter of 1992.

Potted into 90 mm liner pots March 1993.

Potted-on into 3 litre containers July 1993.

Herbaceous: Bought in as well rooted cuttings from Lucksbridge Nurseries and potted direct into 2 litre Containers July 1993.

Alpines: Bought in as small rooted plugs from Anglia Alpines and potted direct into 90 mm pots in July 1993.

Assessments

1. *Year 1*

Plant growth scores at 10 and 20 weeks after potting including size, vigour, foliage colour and phytotoxicity as appropriate to species.

Final assessment May 1993 :	Size score
	Phytotoxicity/chlorosis score
	Flowering score
	% Root cover over pot-ball
	% Moss and liverwort cover (*Elaeagnus* only)
	Plant top dry weight (g).

2. *Year 2*

Interim assessment November 1993 :	Size/vigour scores
	Colour/phytotoxicity scores as appropriate to species
Final assessment June 1994:	Size/vigour scores
	Colour/phytotoxicity scores as appropriate
	Flower score as appropriate
	% Root cover over pot-ball
	Number of vine weevil larvae/pot as appropriate

For each variate, up to 5 score plants, representing the full range of growth seen across the trial were selected, with each plant to be recorded visually assessed against these and accorded a score. Score plants were photographed and samples of these can be seen in the Plates in Appendix IV. Full details of each assessment plus statistical analyses can be found in Appendices II and III, with examples of main effects illustrated in the Plates in Appendix IV.

Statistical Analysis

Results were analysed using the Standard Analysis of Variance (ANOVA). The degrees of freedom (d.f), standard error (SED) and least significant differences at 5% (LSD), on which the significance tests were based are presented in the tables to aid interpretation of the results.

RESULTS

Results for the two years are dealt with together on a per species basis, with main effects of suSCon Green summarised over the three media common to all species (Peat, Peat:Bark and Coir) in Tables 6 and 7 at the end of this Results section (pp. 22-23).

HARDY NURSERY STOCK SPECIES

Elaeagnus ebbingei

This was the only species to have all media x suSCon Green treatments included. The second year was essentially a repeat of the first with the exception of the 100% Mixed Conifer Bark, which proved so difficult to water in Year 1, that it was mixed with 50% Peat in the second season. Year 2 also included a 70:30 Peat:Rockwool mix.

Year 1 (Appendix II, Table 8)

The only difference between treatments after 10 weeks was the significant improvement in plant vigour in the standard 75% Peat:25% Pine Bark mix compared with other media, suggesting plants in this treatment had established faster.

Average effects of media on plant vigour after 10 weeks (5=greatest vigour)

Woodfibre/Bark	*Conifer Bark*	*Peat/Cambark*	*Coir*	*75% Coir*	*50% Coir*	*25% Coir*	*Peat*
2.37	2.35	2.87	2.38	2.47	2.23	2.17	2.45

LSD(5%)= ± 0.38

This was even more marked after 20 weeks with plants in the Peat:Pine Bark mix significantly larger than all other treatments. By this time growth is the Woodfibre/Bark, Mixed Conifer Bark and Coir based mixes with 50% or more Coir included, were significantly smaller than the Peat based control. Substitution of peat with 25% Coir produced as good a result as peat on its own.

Average effects of media on plant size after 20 weeks (5=largest)

Woodfibre/Bark	*Conifer Bark*	*Peat/Cambark*	*Coir*	*75% Coir*	*50% Coir*	*25% Coir*	*Peat*
1.35	1.33	2.80	1.70	1.71	1.80	2.25	2.25

LSD(5%)= ± 0.32

Significant differences in foliage colour were also apparent, with plants grown without suSCon Green darker overall, than those where mixes had it incorporated.

Average effects of suSCon Green on foliage colour after 20 weeks (3=darkest)

suSCon Green (kg/m^3)	**Nil**	**1.0**	**1.25**	**1.5**	
	2.50	2.15	2.10	2.19	*LSD(5%)= ± 0.19*

In addition, there was a highly significant interaction between suSCon Green and growing media (Table 8, Appendix II), with suSCon Green having a detrimental effect on plant size in 100% Coir and Peat mixes regardless of rate, while growth in the Peat:Pine Bark mixes was unaffected by its inclusion. Similarly with colour, while there were no significant differences in foliage colour between the untreated controls and increasing rates of suSCon Green incorporation in Peat:Pine Bark, Peat and 75% Peat mixes, plants in Woodfibre/Bark, Mixed Conifer Bark and 100% and 75% Coir mixes had paler foliage, overall, where suSCon Green was added. The addition of 50% Peat with Coir negated the adverse effects of suSCon Green.

This pattern of results followed through to the end of the trial in May 1993, with plants in the Peat:Pine Bark and 75% and 100% Peat mixes still producing the largest plants, which were significantly better than those in the Woodfibre/Bark and Mixed Conifer Bark mixes. A similar trend was seen in root development over the pot-ball with that in 100% Coir, as well as the Woodfibre/Bark and Mixed Conifer Bark mixes having significantly less roots over the surface than the Peat:Pine Bark and mixes containing over 50% peat.

Average effects of media on plant growth by May 1993

	Woodfibre/Bark	*Conifer Bark*	*Peat/Cambark*	*Coir*	*75% Coir*	*50% Coir*	*25% Coir*	*Peat*
Size Score (5=largest)	2.32	2.29	4.00	3.07	3.06	3.19	3.59	3.73
			LSD(5%)= ± 0.47					
% Root	16.0	15.5	30.5	19.7	21.1	26.8	27.2	27.0
			LSD(5%)= ± 5.8					

Overall, inclusion of suSCon Green in the mix produced a small but significant reduction in top and root growth, and at the highest rate incorporated (1.5 kg/m^3) also increased the incidence of yellowing, chlorotic foliage.

Average effects of suSCon Green on plant growth by May 1993

suSCon Green (kg/m^3)	**Nil**	**1.0**	**1.25**	**1.5**	
Size Score (5=largest)	3.68	3.02	3.13	2.79	*LSD(5%)= ± 0.33*
% Root	26.8	21.7	22.3	21.1	*LSD(5%)= ± 21.1*
Chlorosis (4=most)	1.30	1.32	1.40	1.91	*LSD(5%)= ± 0.22*

The interaction of suSCon Green and growing media again proved highly significant when plant growth in terms of dry weight was examined (Table 1). There was a reduction in plant weight in the Coir and Peat mixes in particular, in response to the incorporation of suSCon Green at all rates, with a similar pattern also seen in the smaller plants in the Mixed Conifer Bark media. In the Peat:Pine Bark mix, however, differences between growth in those with and without suSCon Green incorporated were small and not significant. There was variability in the Coir:Peat mixes, and somewhat surprisingly, based on the response in 100% Peat and Coir, the incorporation of suSCon Green in the combinations did not always reduce growth to the levels observed in the individual mixes.

Table 1: Final plant dry weight by 27 May 1993 (g)

Media	Rate of suSCon Green (kg/m^3) Nil	1.0	1.25	1.5	Mean	
Woodfibre/Bark	21.41	17.75	20.43	12.43	***18.05***	
Mixed Conifer Bark	21.93	15.14	14.65	13.57	***16.32***	
75:25 Peat:Pine Bark	33.15	29.59	25.93	26.99	***28.91***	*LSD(5%)*
100% Coir	33.13	19.89	17.85	17.57	***22.11***	*= ±3.37*
75:25 Coir:Peat	25.40	19.86	21.36	18.97	***21.40***	
50:50 Coir:Peat	25.85	18.78	24.50	18.07	***21.80***	
25:75 Coir:Peat	28.22	19.45	22.83	29.73	***25.06***	
100% Peat	35.12	24.01	20.63	19.94	***24.92***	
Mean	***28.03***	***20.56***	***21.02***	***19.67***	LSD(5%) for figures in body of table = ± 6.74	
		LSD (5%)= ±2.38				

Moss and Liverwort proved a major problem in the absence of a herbicide programme which was omitted to ensure there were no confounding of results in respect of monitoring suSCon Green for phytotoxicity. Overall, moss dominated, though liverwort appeared more of a problem in the Woodfibre/Bark mix. There was no effect on the presence of moss or liverwort from suSCon Green incorporation, but growing media had a major influence, with very little of either weed present in the mixed Conifer Bark. The openness of this mix made it very difficult to water and would also have limited inoculum establishment.

Year 2 (Appendix II, Table 21)

The addition of 50% Peat with the Mixed Conifer Bark:Bark markedly improved its performance and this mix produced some of the best plants in this season. In addition, in direct contrast to the first season, the Woodfibre/Bark/Vermiculite mix also produced results as good as the Peat:Bark mixes.

By the end of the growing season (November 1993), the Woodfibre/Bark/Vermiculite, Peat:Pine Bark and Peat:Conifer Bark mixes had produced the largest most vigorous plants, with all other mixes apart from the 75% Coir:25% Peat, significantly smaller. Growth this season in the 100% Peat mix was surprisingly poor. Plants grown in 100% Coir were significantly paler than other mixes.

Average effects of media on plant growth by November 1993

	Woodfibre/Bark	*Conifer Bark/Peat*	*Peat/Cambark*	*Coir*	*75% Coir*	*50% Coir*	*25% Coir*	*Peat*	*Peat/Rockwool*
Size	2.93	3.15	2.82	2.38	2.67	1.93	2.37	1.85	2.18
(5=largest)				*LSD(5%)= ± 0.37*					
Vigour	2.05	2.23	2.18	1.62	2.00	1.90	1.88	1.82	1.98
(3=greatest)				*LSD(5%)= ± 0.20*					
Colour	1.87	1.98	1.93	1.48	1.92	1.75	1.95	1.70	1.87
				LSD(5%)= ± 0.15					

There was a consistent pattern of a significant reduction in plant size and vigour where suSCon Green had been incorporated. Effects on foliage colour were small with only the highest rate of suSCon Green in the 100% Coir and Woodfibre/Bark/Vermiculite mixes causing any degree of foliage paling.

Average effects of suSCon Green on plant growth by November 1993

***suSCon Green* (kg/m^3)**	**Nil**	**1.0**	**1.25**	**1.5**	
Size (5=largest)	2.84	2.52	2.27	2.27	*LSD(5%)= ± 0.25*
Vigour (3=greatest)	2.19	1.93	1.84	1.84	*LSD(5%)= ± 0.14*

By Spring 1994, 14 months after initial potting, the growth in the Woodfibre/Bark/Vermiculite, Mixed Conifer Bark:Peat and Peat:Pine Bark mixes were still significantly ahead of the other mixes with the exception of the 75% Coir:25% Peat and Peat:Rockwool mixes which gave intermediate results.

Average effects of media on plant growth by June 1994

	Woodfibre/Bark	*Conifer Bark/Peat*	*Peat/Cambark*	*Coir*	*75% Coir*	*50% Coir*	*25% Coir*	*Peat*	*Peat/Rockwool*
Size	3.67	3.80	3.47	2.80	3.28	2.55	2.83	2.35	3.10
(5=largest)				*LSD(5%)= ± 0.41*					
% Root	39.2	38.4	35.4	27.6	31.3	21.0	23.3	19.8	36.3
				LSD(5%)= ± 4.2					

Root growth followed the same pattern as top growth with the Woodfibre/Bark/Vermiculite, Mixed Conifer Bark:Peat, Peat:Pine Bark and Peat:Rockwool having a significantly greater density of root over the pot-ball surface than other mixes. 100% Coir and Peat had the least root development. While incorporation of suSCon Green at 1.0 kg/m^3 had no adverse effect on root growth, the two higher rates caused a relatively small, but significant, reduction in root development.

Overall, size and bushiness decreased with suSCon Green at 1.25 kg/m^3 and above, but not at the lower rate (1.0 kg/m^3). At this time no significant interaction of suSCon Green with growing media was demonstrated, though as in the first season, the highest rate of suSCon Green in Coir produced a far greater reduction in plant growth than in other mixes.

Foliage colour was unaffected by the addition of suSCon Green in this season, but the greenest plants were produced in the Woodfibre/Bark/Vermiculite, Mixed Conifer Bark:Peat, Peat:Pine Bark and Peat:Rockwool mixes.

Average effects of suSCon Green on plant growth by June 1994

suSCon Green (kg/m^3)	**Nil**	**1.0**	**1.25**	**1.5**	
Size (5=largest)	3.43	3.36	2.84	2.75	*LSD(5%)= ± 0.28*
% Root	33.2	34.4	27.0	26.4	*LSD(5%)= ± 2.8*

There was also a significant interaction between suSCon Green and growing media in respect of root growth, with the reduced development at the higher rate (1.5 kg/m^3) greater in the mixes containing the higher proportions of Coir, (Table 21, Appendix II).

All other species in the trial were only grown in three growing media, namely, 75% Peat:25% Pine Bark, 100% Coir and 100% Peat, though each included the four suSCon Green treatments.

Japanese *Azalea* (Appendix II, Table 10 and Appendix III, Table 22)

The cultivar **'Rosebud'** was used in Year 1 and plants produced in the Peat:Pine Bark and 100% Peat mixes were significantly larger than those in 100% Coir. This was also reflected in the dry weight of prunings removed in the Spring of 1993, and followed on into the final assessments taken in early July 1993, for both top and root growth.

Top growth in the Peat:Pine Bark and Peat mixes appeared unaffected by the incorporation of suSCon Green, but there was a significant reduction in root growth in these mixes from its inclusion, regardless of rate.

The adverse effects of suSCon Green were more noticeable in the Coir based mix, where both top and root growth were affected, with root development again poor at all three rates of suSCon Green, and top growth significantly poorer at the highest rate compared with the untreated mix. There was also an

indication of reduced growth from inclusion of suSCon Green between 1-1.25 kg/m^3, though this did not prove significant.

The loss of plants in the untreated controls appeared to be the result of a natural infestation of vine weevil girdling the stems, though little if any root damage was seen, the larvae confining themselves to the centre of the container around the stem area. No larvae were seen in the suSCon Green treated pots.

A similar pattern of results was seen for **'Blue Danube'** in the second season, with roots again more affected than top growth to the presence of suSCon Green, though with this cultivar significant reduction in root development only occurred at the highest rate of suSCon Green (1.5 k/m^3), and was less severe in Peat:Pine Bark than in the Peat mix. As with 'Rosebud', results in the Coir mix were poor.

Erica carnea (Appendix II, Table 11, Appendix III, Table 23)

With ***Erica carnea*** **'King George'**, used in Year 1, plants in Peat:Pine Bark and 100% Peat mixes were more vigorous than those in Coir after 10 weeks, and significantly larger after 20 weeks. This pattern followed through to the final assessment with plants in Coir being smaller and less vigorous than those in the Peat/Peat:Pine Bark mixes, as well as having less root development.

Overall, plants in the untreated mixes were significantly larger with greater root development than those where suSCon Green was incorporated. As with *Azalea* effects of suSCon Green were more pronounced on root growth, especially in the Peat and Coir based mixes.

Table 2 Main effects of treatments on growth by July 1993 – *Erica carnea* 'King George'

	Growing Media			Rate suSCon Green (kg/m^3)			
	Peat:Pine Bark	**Coir**	**Peat**	**Nil**	**1.0**	**1.25**	**1.5**
Size Score (5=largest)	3.04	1.64	3.10	3.11	2.58	2.33	2.34
	LSD(5%)= ± 0.66			*LSD(5%)= ± 0.77*			
Dry Weight (g)	5.23	3.66	4.70	5.37	4.48	4.01	4.27
	LSD(5 %) = ± 0.57			*LSD(5%) = ± 0.66*			
% Root	23.4	16.3	23.9	31.1	21.0	14.4	18.3
	LSD(5%) = ± 5.74			*LSD(5%)= ± 6.62*			

Erica carnea **'Myretoun Ruby'**, included in the second season, was a more vigorous variety than *Erica carnea*'King George', but still proved sensitive to suSCon Green in some mixes. Where Peat:Pine Bark was used incorporation of suSCon Green had no adverse on top or root growth, but in Peat, and especially Coir, its inclusion significantly reduced plant size and root development.

Table 3 % Root cover over pot-ball by late June 1994 – *Erica carnea* 'Myretoun Ruby'

Media	Rate of suSCon Green (kg/m^3)				Mean	
	Nil	1.0	1.25	1.5		
75:25 Peat:Pine Bark	80.3	82.9	73.5	74.7	*77.8*	*LSD(5%)*
100% Coir	73.0	61.0	44.3	34.7	*53.2*	*= ±6.7*
100% Peat	92.7	77.3	63.3	66.2	*74.9*	
Mean	*82.2*	*73.7*	*60.4*	*58.5*	LSD(5%) for figures in body of table = ± 13.5	
		LSD(5%) = ±7.8				

Calluna vulgaris **'Firefly'** (Appendix III, Table 24)

This species was included in Year 2, the best top and root growth was achieved in the Peat:Pine Bark, closely followed by Peat, with those in Coir significantly smaller.

Incorporation of suSCon Green, even at the highest rate, had no apparent adverse effect on growth in the Peat:Pine Bark and Peat mixes, but in Coir growth during the first season was poorer at the higher levels of suSCon Green (1.25/1.5 kg/m^3), though this effect had largely disappeared by the end of the trial.

Ceanothus **'Autumnal Blue'** (Appendix II, Table 12)

The pattern of results for this species, included in Year 1, were essentially similar to those reported with the other species, with poorer growth in Coir throughout. At 10 and 20 weeks the best results, overall, were achieved in the Peat:Pine Bark mix, but by the end of the trial both Peat:Pine Bark and Peat had produced similar growth.

suSCon Green had no adverse effect on top or root growth in the Peat:Pine Bark mixes, regardless of rate, but produced a relatively small but significant reduction in root development at the highest rate (1.5 kg/m^3) in the Peat mix, and a progressive, more marked reduction in Coir, which was also accompanied by a significant reduction in plant weight at the highest rate. There was also evidence of a check to flowering in Coir where suSCon Green was incorporated and an indication in the first season that these plants were paler.

Table 4 % Root cover over pot-ball by late May 1993 – *Ceanothus* 'Autumnal Blue'

Media	Rate of suSCon Green (kg/m^3)				Mean	
	Nil	1.0	1.25	1.5		
75:25 Peat:Pine Bark	57.9	46.2	58.0	54.7	*54.2*	*LSD(5%)*
100% Coir	47.7	34.7	23.0	12.0	*29.4*	*= ±6.9*
100% Peat	65.6	53.3	52.2	47.7	*54.7*	
Mean	*57.0*	*44.7*	*44.4*	*38.1*	LSD(5%) for figures in body of table = ± 13.9	
		LSD 5% = ±8.0				

***Cotoneaster* 'Cornubia'** (Appendix III, Table 25)

With this species, included in the second year of the project, growth in Coir was as good as that in Peat and Peat:Pine Bark mixes, and by the end of the trial no obvious differences between mixes were noted, though at the interim record it appeared that growth was being checked by the highest rate of suSCon Green incorporation.

A high number of deaths were recorded in the untreated Peat plots, again thought to be the result of vine weevil activity.

***Hypericum* 'Hidcote'** (Appendix III, Table 26)

Hypericum was included in the second year of the project.

Overall, similar growth was achieved in the Peat:Pine Bark and Peat mixes, but again that in Coir was significantly reduced by the end of the growing season, though these plants caught up in the subsequent spring flush of growth.

suSCon Green proved highly detrimental to this species in this trial, with a significant number of deaths occurring and top and root growth of the surviving plants being severely reduced at all rates of incorporation. Effects on root growth were particularly marked (Appendix IV, Plate 9). Foliage colour was also paler at the two higher rates of suSCon Green.

***Potentilla fruticosa* 'Tangerine'** (Appendix II, Table 13, Appendix III, Table 27)

This species was included for both years of the trial.

Growth, overall, was similar in all three media.

Adverse effects of suSCon Green became obvious by the 20 week assessment in the first year with plants at the two higher rates of suSCon Green being significantly smaller than at the lower rate or untreated control. A similar pattern was seen in the second year at the interim record, though plant growth was more variable in this season and did not prove significant. As with other species, differences in top growth the following spring did not prove significant.

There was a significant interaction of suSCon Green with growing media on root growth in Year 1, with development unaffected by its incorporation in the Peat:Pine Bark and Peat mixes, but significantly reduced at all rates in the Coir. In Year 2 there was a small reduction in root growth in all media where suSCon Green was included, which at the higher rate proved significant.

In contrast to other species, greater flowering occurred with plants in suSCon Green treatments.

Poor results in the untreated plots in Peat were recorded, and appeared to be related, in part, to a natural infestation of vine weevil.

***Pyracantha* 'Orange Glow'** (Appendix II, Table 14)

Included in first year of project.

There was a general trend for plants grown in Coir to be somewhat smaller than those in the Peat:Pine Bark and Peat based mixes, though this did not always prove significant, and Coir produced the best rooting.

Table 5 Main effects of growing media in plant growth

Media	10 weeks Vigour Score (5=greatest)	20 weeks Size Score (5=largest)	Final Dry weight (g)	% Root
Peat:Pine Bark	2.80	4.20	31.17	26.7
Coir	2.33	3.40	28.66	36.1
Peat	2.43	3.97	34.36	22.8
LSD(5%) = ±	*0.43*	*0.49*	*4.87*	*5.4*

Use of suSCon Green had no obvious adverse with this species, a small reduction in growth in the Peat mix with the high rate of suSCon Green having disappeared by the end of the trial.

The results for the untreated plants in Peat need to be used with caution due to a significant loss of plants in this mix, with the stronger plants surviving and confounding the results. (esp. Dry weight).

Viburnum tinus (Appendix II, Table 15)

Included in Year 1 of the project.

A reduction in plant growth in Coir by week 20 was less obvious by the end of the trial. All rates of suSCon Green caused an overall reduction in growth, but especially at the highest rate (1.5 kg/m^3).

There was a significant interaction of growing media and suSCon Green on root development, with Coir in the absence of the insecticide giving as good a result as Peat:Pine Bark, but the poorest rooting where it was included. In the Peat:Pine Bark mixes only the highest rate of suSCon Green caused any reduction in root development, while that in Peat was affected by the two higher rates but not 1.0 kg/m^3.

Chamaecyparis lawsoniana **'Ellwoods Gold'** (Appendix III, Table 28)

The main influence on this species, included in the second year of the project, was growing media, with Coir, in contrast to other species, producing larger plants with slightly better rooting than Peat:Pine Bark or Peat.

Incorporation of suSCon Green had no obvious adverse effect on growth of this species.

Chamaecyparis lawsoniana **'Stardust'** (Appendix II, Table 16)

By the end of the trial plants, on average, were, smaller in Coir compared with Peat:Pine Bark and especially Peat mixes where the differences proved significant..

Taken overall, incorporation of suSCon Green appeared to have no significant influence on growth.

***Rhododendron* 'Ginny Gee' Observation** (Appendix III, Table 35)

This species was only included in the Peat based mix as an unreplicated observation, to examine whether poor growth seen with this cultivar was related to suSCon Green incorporation.

In the event, suSCon Green even up to the highest rate (1.5 kg/m^3) proved safe, with no adverse effects on top or root growth seen. However, an effect on root distribution was observed, with small areas around granules remaining clear of root. This has been called the 'Halo' effect and appears to be an inhibition of root development in the area, rather than damage to existing root. (Appendix IV, Plate 10).

HERBACEOUS

Astilbe **'Joe Ophurst'** (Appendix II, Table 17)

Similar growth was achieved in all media.

Incorporation of suSCon Green at 1.0 kg/m^3 had no significant influence on growth compared with the untreated controls, but at the highest rate did cause some reduction in size and dry weight, together with a reduction in number of flowering spikes. In Coir the adverse effect of suSCon Green began at the 1.25 kg/m^3 rate.

Root development was not affected by suSCon Green with this species. On the contrary it appeared to improve in the suSCon Green treated pots, though this could well have been due, in part, to a natural infestation of vine weevil getting into the untreated plots.

***Bergenia* 'Sunningdale'** (Appendix II, Table 11)

At the 10 and 20 week assessments, Coir was producing smaller plants than either Peat:Pine Bark or Peat mixes, and although they had apparently caught up in terms of size, by the final assessment, plant dry weight was still significantly reduced compared with the other mixes.

Plant growth was also affected by incorporation of suSCon Green, with the highest rate (1.5 kg/m^3) causing a significant reduction in size and dry weight in all mixes. Adverse effects of suSCon Green were marked in the Coir mix.

Root development was unaffected by inclusion of suSCon Green in either of the Peat:Pine Bark or Peat mixes, but in Coir incorporation of the insecticide reduced visible root over the pot ball as rate increased.

***Heuchera* 'Palace Purple'** (Appendix II, Table 19)

Growth was similar in all three media with this species, and inclusion of suSCon Green in the mix had no significant adverse effect, even at the highest rate.

***Hosta* 'Honey Bells'** (Appendix II, Table 20)

A reduction in growth observed after 20 weeks in response to suSCon Green at all rates in Coir, and in Peat at the higher rate, had disappeared by the final assessment in May, following the new flush of growth.

While root development was similar in all growing media in the untreated plots, there was a significant interaction between media and suSCon Green. Here, a reduction in root development, as a result of suSCon Green incorporation, was greater in Coir than in the Peat:Pine Bark or Peat mixes.

Sedum **'Autumn Joy'** (Appendix III, Table 24)

Plant growth appeared to be unaffected by either type of growing media used or incorporation of suSCon Green, even at the higher rate.

However, towards the end of the first season, plant stems became very brittle and snapped off at the base in response to handling or wind movement. On investigation, this was found to be due to a natural infestation of vine weevil girdling the base of the stems. All treatments were affected and pots were destructively sampled at this point and a count of vine weevil larvae made. The highest counts were in the untreated pots, with an average of 35 found in the Peat and Coir, and 56 in the Peat:Pine Bark mix. There was considerable variability in numbers between pots and in the untreated plots several pots had in excess of 100 larvae in the 2 litre container, and one had 153 present! However, larvae were also found in the pots with suSCon Green incorporated, but these were mainly found in the centre of the pot within the untreated plug used as the start material. Consequently, though fewer in number, compared with the untreated plots, they were in the right area and of significant number to cause considerable damage to the *Sedum* stems.

HERBACEOUS/ALPINES (2 litre containers)

***Dianthus* 'Wraithman Jubilee'** (Appendix III, Table 31)

There was a major influence of growing media with this species, the largest plants overall, being produced in the Peat:Pine Bark mix, closely followed by those in those in Peat, with those in Coir markedly smaller. The plants in Coir were particularly poor by comparison at the end of the first season, and while they had recovered to some extent by the end of the trial, were still significantly behind the other mixes.

There was also a significant reduction in growth and root development at the highest rate of suSCon Green in Peat:Pine Bark and Peat, while in Coir this reduction occurred at all three rates.

***Phlox subulata* 'Red Wing'** (Appendix III, Table 32)

Taken overall, results in the three media without suSCon Green incorporated, were similar. In the Peat:Pine Bark mix, inclusion of suSCon Green had no adverse effect on growth, results being similar to the untreated control. Incorporation in the Peat mix, however, caused a significant reduction in size at the highest rate (1.5 kg/m^3), while in Coir, all rates proved detrimental. Use of suSCon Green also caused a greater degree of yellowing in plants.

A reduction in visible root occurred at all rates of suSCon Green in all media.

ALPINES (90 mm pots)

Arabis (Appendix III, Table 29)

Plant growth was variable with this species, and results need treating with caution, especially as some naturally occurring vine weevil were found in the untreated pots, confounding growing media/suSCon Green comparisons. There was, however, little evidence to suggest that incorporation of suSCon Green was having a detrimental effect on growth. This species grew well in the Coir mix.

Variegated *Aubretia* (Appendix III, Table 30)

As with *Arabis*, growth of this species was also variable, making robust comparisons difficult.

A natural infestation of vine weevil demonstrated their preference for the Peat:Pine Bark and Coir mixes, and 100% control was not achieved in these mixes from incorporation of suSCon Green.

Growth in Coir equalled that in Peat:Pine Bark with this species, both producing better results, overall, than Peat. Inclusion of suSCon Green did not appear to be causing any significant reduction in growth or root development, though the latter was confounded by the presence of vine weevil, particularly in the untreated control.

Mossy Saxifrage 'Stansfeldii' (Appendix III, Table 33)

The natural infestation of vine weevil caused major problems with this species, killing out a large proportion of the untreated controls, making comparisons of the safety of use of suSCon Green impossible. (Appendix IV, Plate 4). While the untreated controls had the greatest number of vine weevil larvae present, there were also considerable numbers in the suSCon Green 'protected' pots. However, as with *Sedum*, where suSCon Green was incorporated the majority of larvae had remained confined to the original untreated plug site, and caused sufficient damage to prevent root development reaching the outside of the pot ball. Fewer larvae were recorded in the Coir mix with this species, and here root development in the treated pots did manage to radiate out over the pot-ball surface.

Table 6

Summary of plant growth as influenced by growing media and suSCon Green

Hardy Nursery Stock

(*** = best growth, ** = moderate growth, * = poorer growth)

		Peat				Peat:Bark				Coir			
Rate of suSCon		**Nil**	**1.0**	**1.25**	**1.5**	**Nil**	**1.0**	**1.25**	**1.5**	**Nil**	**1.0**	**1.25**	**1.5**
Azalea	Top	***	***	***	***	***	***	***	***	**	**	**	*
'Rosebud'	Root	***	**	**	**	***	**	**	**	**	*	*	*
Azalea **'Blue**	Top	***	***	***	**	***	***	***	***	*	*	*	*
'Danube'	Root	***	**	**	*	***	***	**	**	*	*	*	*
Calluna vulgaris	Top	***	***	***	***	***	***	***	***	**	**	**	**
'Firefly'	Root	***	***	***	**	***	***	***	***	**	***	***	**
Erica carnea	Top	***	**	**	**	***	***	**	**	**	*	*	*
'King George'	Root	***	**	**	**	***	***	***	***	**	**	*	*
Erica carnea	Top	***	**	**	**	***	***	***	***	*	*	*	*
'Mertoun Ruby'	Root	***	**	**	**	***	***	***	***	***	**	*	*
Ceanothus	Top	***	***	***	***	***	***	***	***	**	**	**	*
	Root	***	***	***	**	***	***	***	***	**	**	*	*
Cotoneaster	Top	***	***	***	***	***	***	***	***	***	***	***	***
	Root	***	***	***	***	***	***	***	***	***	***	***	***
Elaeagnus	Top	**	**	**	**	***	**	**	**	**	**	**	*
	Root	***	**	**	**	***	***	***	***	***	**	**	**
Hypericum	Top	***	**	*	*	***	**	*	*	***	**	*	*
	Root	***	**	*	*	***	**	*	*	**	*	*	*
Potentilla	Top	Similar size across all treatments											
	Root	***	***	***	**	***	***	***	**	***	**	**	**
Pyracantha	Top	Plants in Coir slightly smaller, no obvious adverse effects of suSCon Green											
	Root	**	**	**	**	**	**	**	**	***	***	***	***
Viburnum	Top	***	**	**	**	***	***	***	**	***	**	***	**
	Root	***	***	**	**	***	***	***	***	***	**	**	**
C.I.	Top	Plants in coir slightly larger, no adverse effects of suSCon Green											
'Ell. Gold'	Root	Greater root development in coir, no adverse effects of suSCon Green											
C.I.	Top	Plants in coir smaller, no adverse effects of suSCon Green											
'Stardust'	Root	No significant differences between treatments											

Table 7

Summary of plant growth as influenced by growing media and suSCon Green

Herbaceous

(*** = best growth, ** = moderate growth, * = poorer growth)

		Peat				Peat:Bark				Coir			
Rate of suSCon		**Nil**	**1.0**	**1.25**	**1.5**	**Nil**	**1.0**	**1.25**	**1.5**	**Nil**	**1.0**	**1.25**	**1.5**
Astilbe	Top	***	***	***	**	***	***	***	**	***	***	**	**
	Root	Root development similar across mixes, no adverse effects of suSCon Green											
Bergenia	Top	***	**	**	**	***	**	**	**	**	**	*	*
	Root	***	***	***	***	***	***	***	***	***	***	**	*
Heuchera	Top	No significant differences between treatments											
	Root	Differences in root volume not significant											
Hosta	Top	No significant differences between treatments											
	Root	***	**	**	**	***	**	**	**	***	*	*	*
Sedum	Top	Plants in coir smaller than rest, no adverse effects of suSCon Green											
	Root	Volume of root adversely affected by vine weevil infestation.											
	No. larvae/pot	57	6	4	3	38	8	4	8	33	7	4	4

Alpines

(*** = best growth, ** = moderate growth, * = poorer growth)

Arabis	Top	Plants in peat smaller than rest, no adverse effects of suSCon Green											
	Root	Greater root development in Peat:Bark, no adverse effects of suSCon Green											
Aubretia	Top	Plants in peat smaller than rest, no adverse effects of suSCon Green											
	Root	Root development similar across treatments											
Dianthus	Top	***	***	**	*	***	***	***	**	**	*	*	*
	Root	***	***	**	*	***	***	***	**	***	**	**	**
Phlox	Top	***	***	***	**	***	***	***	***	***	**	**	**
	Root	***	**	**	**	***	**	**	**	***	**	**	**
Saxifrage	Top	Natural infestation of vine weevil											
	Root	No apparent adverse effects of suSCon Green											
	No. larvae/pot	7	4	4	4	9	7	3	3	4	1	1	1

DISCUSSION

The two year programme of work examined the safety of use of suSCon Green over a range of 14 shrub, 5 herbaceous and 5 alpine species in different growing media, on outdoor drained sand beds with overhead irrigation.

Results from the two seasons showed that both growing media and suSCon Green had a major influence on quality of growth and that severity of symptoms could be dependant on rate of suSCon Green and type of growing media used.

Growing media: The full range was only used with *Elaeagnus ebbingei.* The inclusion of a mixed conifer bark in Year 1 gave major problems in irrigation management, since the mix was so open and growth suffered. This was improved in Year 2 by the addition of 50% peat with the mixed conifer bark which improved its water retention properties, and this mix produced some of the best growth in this season. Results with the woodfibre/bark/vermiculite substrate varied with season, with poor results in Year 1, but good results in Year 2. This could also be related to improved water holding properties in the second season. In the second year a 70:30 peat:rockwool mix was included, and this produced similar results to peat.

As observed in other trials, the standard 75:25 peat:pine bark mix still produces the best results overall, closely followed by peat. Results in coir were variable, with the Ericaceous/Calcifuge group growing poorly in this mix, along with several shrubs. Coir produced good results with herbaceous and the alpine species in the trials. Coir has a higher pH than peat, and although lime rates were adjusted, the pH could still have been on the high side for the calcifuge group of shrubs. On the other hand, herbaceous and alpine species included in this work prefered a higher pH, doing better in the coir. There is also the problem of management in the coir, especially over winter and in wet conditions when excessive leaching can occur. Growth in coir was improved by mixing with peat, particularly at 50% and above.

suSCon Green: There was a degree of sensitivity to this insecticide, but mainly at the higher than recommended rates, with the majority of species showing little sign of damage at the rate of 1.0kg/m^3. This 'low' rate was used as the standard throughout the trial, and while it was 25% higher than recommended for peat, it was the recommended rate for mixes with bark or coir present. In addition, uneven mixing could easily distribute more of the chemical into one pot than another, so it was important to check response to this rate even in a peat mix. Where there was a measurable reduction in top or root growth at the 1.0kg/m^3 rate, it was not generally considered to be commercially significant.

'Sensitive' species included evergreen *Azalea, Elaeagnus x ebbingei, Erica carnea, Hypericum* 'Hidcote', *Bergenia, Dianthus, Phlox* and *Viburnum tinus*, where some top and root growth suppression was noted; *Astilbe* with a small reduction in top growth and *Calluna, Ceanothus* 'Autumnal Blue', *Heuchera* and *Hosta* where root growth was reduced. Degree of sensitivity was reduced by addition of 25% pine bark with the peat.

However, there was evidence with a number of species of an interaction between the growing media and suSCon Green, effects being more severe in one mix than another. The safest mix was undoubtedly peat:pine bark, where minimal damage occurred even as rates increased above 1.0kg/m^3. Plants grown in peat appeared more sensitive to increasing rates of suSCon Green than those in peat:pine bark, while this sensitivity increased still further in coir, where even greater damage occurred with some species to increasing rates of suSCon Green (e.g. *Azalea, Erica, Calluna, Elaeagnus).* It was only possible to include a relatively limited range of species in this work and further information on a wider number of species is required. The safety 'buffer' that the pine bark appeared to provide against increasing rate of suSCon Green is seen as a major advantage and confirms results observed in earlier work (confidential work for crop care). This safety factor is also important in the need to use a higher rate of 1.0kg/m^3 to achieve effective control of the vine weevil larvae, compared to the 750g/m^3 recommendation for peat. Conversely, coir which also appears to require the higher rate to provide full control, increases the risk of damage.

While use of suSCon Green did affect top growth to some degree, depending on species, its influence was more marked on root development. A 10-20% reduction on a well rooted plant would not be serious, but could have major implications on weaker rooting species, especially on shelf life after sale.

With ***Rhododendron (and Azalea),*** an effect observed on the root ball was the apparent avoidance by roots of the area immediately around the suSCon Green granules, creating a 'halo' effect. This did not appear to cause any further loss of root or root damage over the season, and did not have any apparent effect on plant growth. Similar 'halos' have been reported on these crops in nurseries.

A natural infestation of vine weevil occurred in the second year, with egg laying adults particularly attracted to ***Sedum*** and Mossy Saxifrage. Here the majority of untreated pots were gradually killed out by larvae activity due to the large numbers present. In one 2 litre container of ***Sedum*** 153 larvae were recovered! However, while the majority of larvae were found in the untreated pots, some were also present in those with suSCon Green incorporated, though in much smaller numbers. These were mostly confined to the original plug site which had been used as the start material, and which did not have suSCon Green present. This underlines the importance of protecting plants at each stage of growth, including propagation, and project HNS 15e which follows on from this one, looks at the safety of using suSCon Green during this critical stage.

In summary, recommended rates of suSCon Green have proved safe for a range of shrub, herbaceous and alpine species, including those considered sensitive, and where a small reduction in growth was measured, this was not generally considered to be of commercial significance. Response to suSCon Green did vary with growing media, with its safety of use increased where 25% granulated pine bark was added with peat. Adverse effects of suSCon Green were greater in coir mixes, with peat intermediate between the two. Performance in coir were improved by the addition of peat.

Results on the control of vine weevil larvae in the different media in response to rate of suSCon Green incorporated is reported in project HNS 15c.

CONCLUSIONS

The work examined the safety of using suSCon Green in different growing media for a range of shrub herbaceous and alpine species.

- Overall, while there was some species sensitivity to suSCon Green, particularly as rates increased, that of 1.0 kg/m^3 proved safe for the majority of species.

- Where there was a measurable reduction in top or root growth, this would not generally have been considered to be commercially significant.

- The importance of even mixing was underlined by the increase in damage in some mixes by relatively small increases in rate of suSCon Green.

- Peat:pine bark mixes produced the best results overall, and the presence of the pine bark appeared to improve the safety of use of suSCon Green for a number of species.

- There was a significant interaction between growing media and suSCon Green with several species, with the adverse effects of suSCon Green becoming more marked in coir, and occurring at lower rates than in peat or peat:pine bark mixes.

- Root growth proved more sensitive to suSCon Green than top growth

- suScon Green sensitive species included evergreen *Azalea, Elaeagnus x ebbingei, Erica carnea, Hypericum* 'Hidcote', *Bergenia, Dianthus, Phlox* and *Viburnam tinus*, where some top and root growth suppression was noted; *Astilbe* with a small reduction in top growth, and *Calluna, Ceanothus* 'Autumnal Blue', *Heuchera* and *Hosta* where root growth was reduced. Degree of sensitivity was reduced by the addition of 25% pine bark with peat.

- A 'halo' effect around the suSCon Green granules, where root growth appeared to be inhibited rather than damaged, was seen with *Rhododendron* and *Azalea.* This did not appear to have any detrimental effect on growth.

- The need to protect all stages of production was highlighted when a natural infestation of vine weevil occurred, and a number of larvae were found in pots protected with suSCon Green. These were confined, in the main, to the core of the plug from the original plant material potted up, which had not been protected against vine weevil, yet was in the perfect position for the larvae to attack the main stems.

- Further work is required to investigate the safety of use of suSCon Green in the propagation stage. This is the subject of project HNS 15e.

RECOMMENDATIONS FOR FURTHER WORK

- Investigate the safety of using suSCon Green during propagation, in order to reduce the risk of vine weevil larvae hatching and surviving in the core of unprotected media when potted on.

  This is the subject of the follow-on project HNS 15e

- Confirm results of the interaction between type of growing media and efficacy of suSCon Green, and other control measures as they are introduced to the market. In this work a proportion of granulated pine bark improved safety of use of suSCon Green, whereas plants in Coir appeared to be more sensitive to the chemical.

- Evaluate new vine weevil control measures as they become available, using suSCon Green as the standard control.

APPENDICES

APPENIDIX 1

Vine Weevil: Phytotoxicity screening of suSCon Green in different growing media

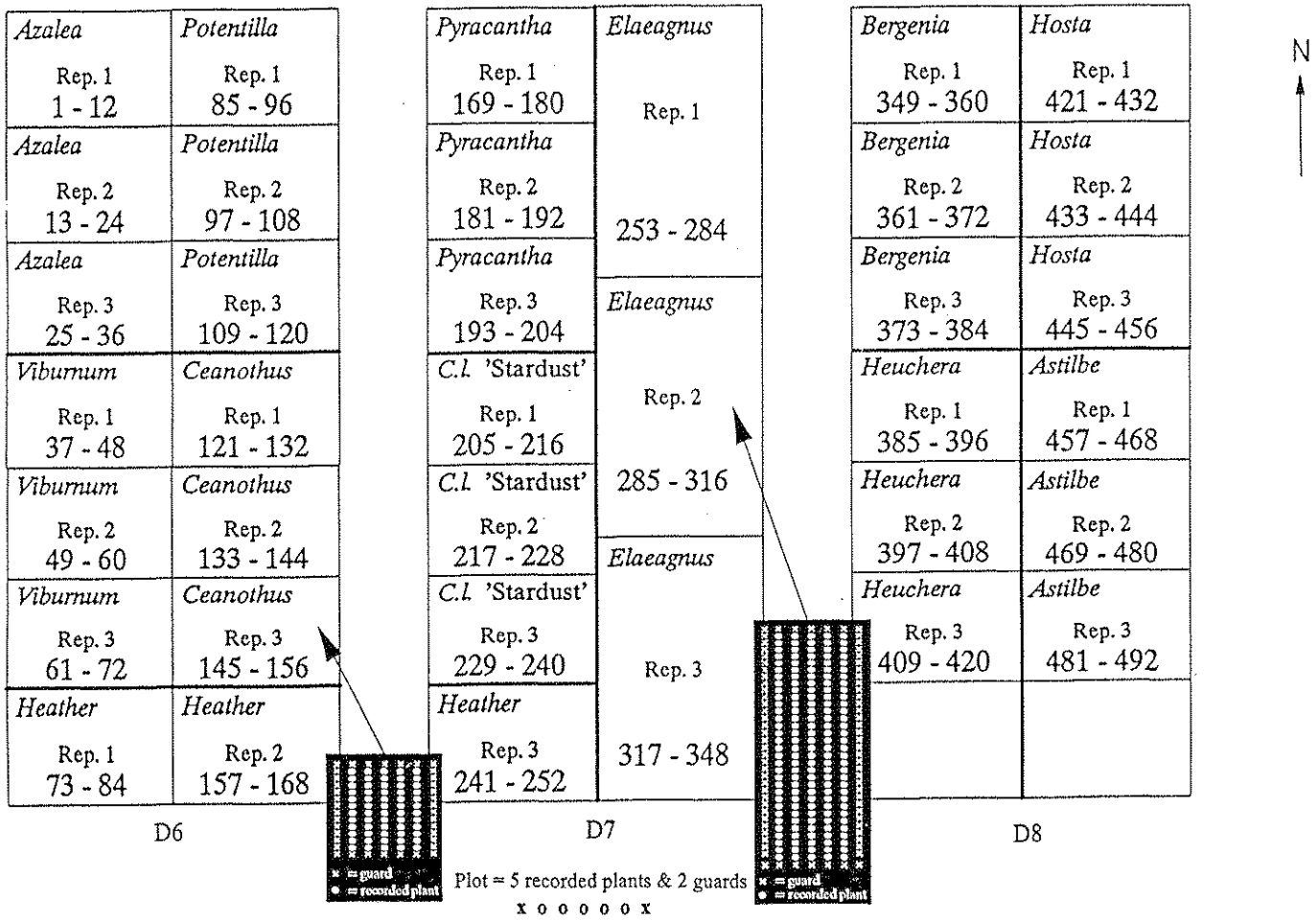
Treatment Key

Treat. No.	Mix Code	Media	Rate suSCon Green
Elaeagnus ebbingei			
1	WB	Woodfibre/Bark (Camlands)	Nil
2	WB	"	1.0 kg/m^3
3	WB	"	1.25 kg/m^3
4	WB	"	1.5 kg/m^3
5	CB	100% Mixed Conifer Bark (Melcourt)	Nil
6	CB	"	1.0 kg/m^3
7	CB	"	1.25 kg/m^3
8	CB	"	1.5 kg/m^3
9	PB	75% Peat/25% Cambark	Nil
10	PB	"	1.0 kg/m^3
11	PB	"	1.25 kg/m^3
12	PB	"	1.5 kg/m^3
13	C	100% Coir	Nil
14	C	"	1.0 kg/m^3
15	C	"	1.25 kg/m^3
16	C	"	1.5 kg/m^3
17	CP75	75% Coir/25% Peat	Nil
18	CP75	"	1.0 kg/m^3
19	CP75	"	1.25 kg/m^3
20	CP75	"	1.5 kg/m^3
21	CP50	50% Coir/50% Peat	Nil
22	CP50	"	1.0 kg/m^3
23	CP50	"	1.25 kg/m^3
24	CP50	"	1.5 kg/m^3
25	CP25	25% Coir/75% Peat	Nil
26	CP25	"	1.0 kg/m^3
27	CP25	"	1.25 kg/m^3
28	CP25	"	1.5 kg/m^3
29	P	100% Peat	Nil
30	P	"	1.0 kg/m^3
31	P	"	1.25 kg/m^3
32	P	"	1.5 kg/m^3
33 (Yr 2 only)	PG	70% Peat/30% Rockwood (Grodan)	Nil
34	PG	"	1.0 kg/m^3
35	PG	"	1.25 kg/m^3
36	PG	"	1.5 kg/m^3
Other Species			
1	PB	75% Peat/25% Cambark	Nil
2	PB	"	1.0 kg/m^3
3	PB	"	1.25 kg/m^3
4	PB	"	1.5 kg/m^3
5	C	100% Coir	Nil
6	C	"	1.0 kg/m^3
7	C	"	1.25 kg/m^3
8	C	"	1.5 kg/m^3
9	P	100% Peat	Nil
10	P	"	1.0 kg/m^3
11	P	"	1.25 kg/m^3
12	P	"	1.5 kg/m^3

APPENDIX 1

Vine Weevil: Phytotoxicity screening of suSCon Green in different growing media

Trial Layout – Year 1 (1992/93)



APPENDIX 1

Vine Weevil: Phytotoxicity screening of suSCon Green in different growing media

Randomisation – Year 1 (1992/93) – Elaeagnus Ebbingei

REP 1		REP 2		REP 3	
plot	trt.	plot	trt.	plot	trt.
253	27	285	19	317	9
254	17	286	2	318	6
255	7	287	8	319	3
256	30	288	25	320	28
257	21	289	7	321	12
258	15	290	32	322	23
259	31	291	30	323	25
260	1	292	21	324	15
261	3	293	22	325	32
262	29	294	4	326	14
263	24	295	28	327	31
264	8	296	27	328	30
265	28	297	5	329	2
266	26	298	26	330	1
267	6	299	3	331	29
268	12	300	16	332	27
269	19	301	1	333	4
270	11	302	29	334	21
271	13	303	15	335	19
272	25	304	10	336	13
273	9	305	17	337	5
274	5	306	31	338	11
275	14	307	18	339	17
276	10	308	23	340	20
277	4	309	6	341	10
278	2	310	20	342	24
279	16	311	12	343	16
280	20	312	14	344	8
281	32	313	9	345	7
282	18	314	13	346	22
283	23	315	11	347	18
284	22	316	24	348	26

APPENDIX 1

Vine Weevil: Phytotoxicity screening of suSCon Green in different growing media

Randomisation – Year 1 (1992/93 – Other HNS Species

REP	AZALEA		POTENTILLA		VIBURNUM		CEANOTHUS		PYRACANTHA		'STARDUST'	
	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.
1	1	1	85	1	37	9	121	3	169	11	205	3
	2	12	86	6	38	6	122	7	170	12	206	11
	3	10	87	12	39	7	123	4	171	5	207	8
	4	5	88	10	40	2	124	10	172	3	208	7
	5	6	89	4	41	4	125	9	173	4	209	12
	6	7	90	3	42	12	126	1	174	6	210	10
	7	8	91	8	43	11	127	11	175	1	211	9
	8	11	92	5	44	8	128	5	176	8	212	6
	9	4	93	9	45	10	129	6	177	2	213	4
	10	2	94	11	46	5	130	8	178	7	214	5
	11	3	95	7	47	1	131	2	179	9	215	1
	12	9	96	2	48	3	132	12	180	10	216	2
2	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.
	13	7	97	3	49	4	133	1	181	12	217	2
	14	6	98	11	50	1	134	11	182	4	218	9
	15	4	99	8	51	8	135	5	183	5	219	1
	16	2	100	5	52	9	136	12	184	3	220	8
	17	11	101	7	53	6	137	8	185	10	221	3
	18	12	102	9	54	11	138	7	186	2	222	4
	19	8	103	10	55	2	139	3	187	11	223	5
	20	1	104	6	56	3	140	4	188	1	224	11
	21	9	105	1	57	7	141	2	189	6	225	12
	22	10	106	12	58	5	142	9	190	9	226	10
	23	5	107	4	59	10	143	10	191	8	227	6
	24	3	108	2	60	12	144	6	192	7	228	7
3	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.
	25	8	109	11	61	11	145	2	193	4	229	6
	26	2	110	5	62	7	146	5	194	9	230	4
	27	11	111	3	63	9	147	11	195	12	231	8
	28	5	112	7	64	2	148	1	196	7	232	7
	29	3	113	12	65	6	149	6	197	11	233	11
	30	6	114	1	66	4	150	4	198	5	234	12
	31	9	115	8	67	12	151	8	199	10	235	2
	32	1	116	2	68	5	152	10	200	2	236	3
	33	12	117	4	69	3	153	9	201	6	237	1
	34	4	118	10	70	10	154	12	202	3	238	10
	35	10	119	9	71	8	155	7	203	8	239	5
	36	7	120	6	72	1	156	3	204	1	240	9

APPENDIX 1

Vine Weevil: Phytotoxicity screening of suSCon Green in different growing media

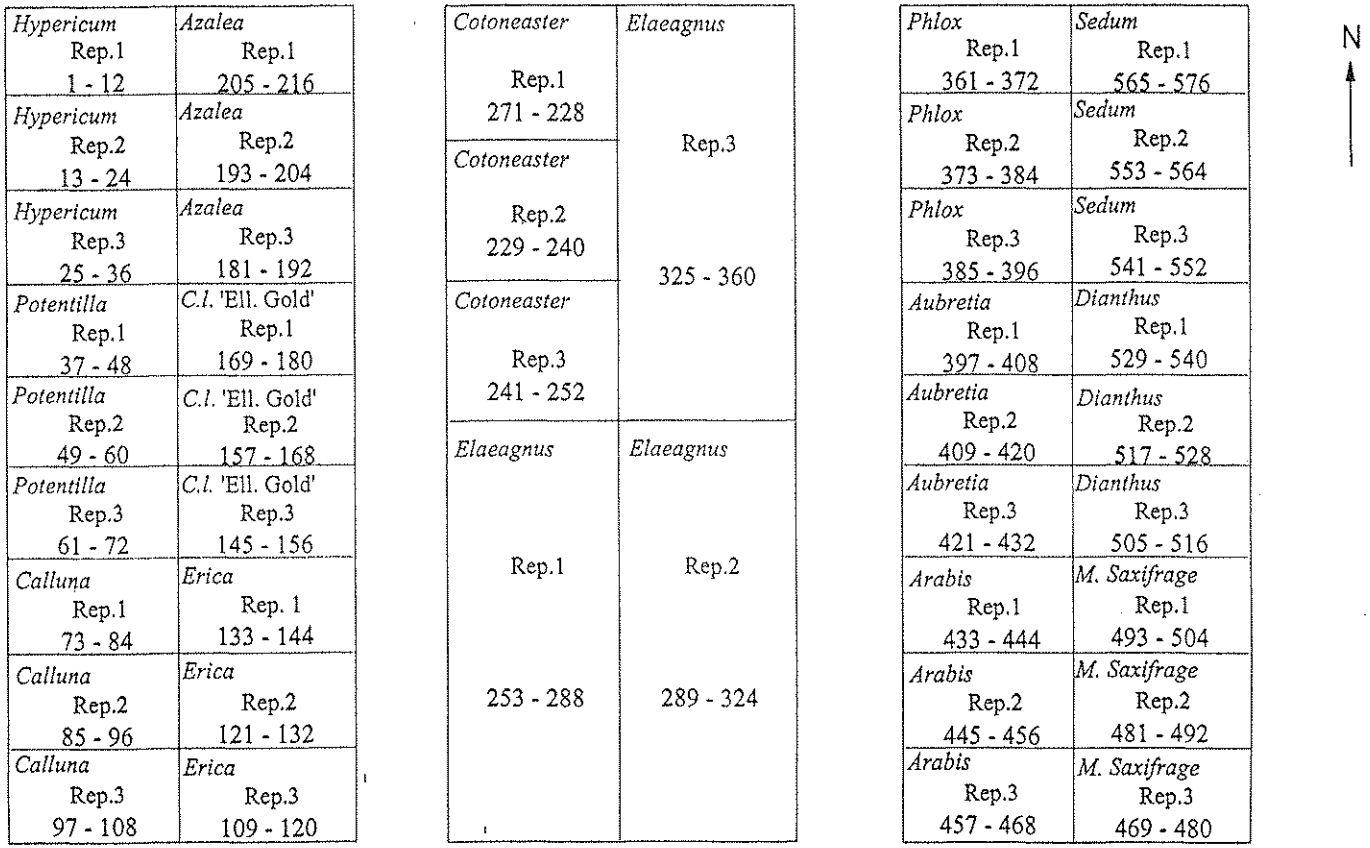
Randomisation – Year 1 (1992/93) – Heather and Herbaceous Species

REP	HEATHER		BERGENIA		HOSTA		HEUCHERA		ASTILBE	
	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.
1	73	10	349	6	421	5	385	3	457	6
	74	6	350	7	422	6	386	8	458	3
	75	5	351	2	423	4	387	11	459	12
	76	2	352	3	424	2	388	12	460	2
	77	9	353	12	425	12	389	9	461	9
	78	4	354	8	426	8	390	6	462	1
	79	7	355	4	427	7	391	4	463	4
	80	11	356	5	428	1	392	2	464	5
	81	3	357	9	429	11	393	7	465	11
	82	12	358	1	430	10	394	5	466	10
	83	1	359	10	431	9	395	1	467	7
	84	8	360	11	432	3	396	10	468	8
2	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.
	157	1	361	12	433	7	397	8	469	5
	158	2	362	10	434	11	398	2	470	11
	159	10	363	7	435	3	399	6	471	9
	160	7	364	5	436	8	400	4	472	7
	161	4	365	3	437	10	401	9	473	4
	162	8	366	2	438	12	402	5	474	3
	163	12	367	4	439	4	403	7	475	6
	164	9	368	11	440	1	404	12	476	8
	165	5	369	8	441	9	405	10	477	1
	166	11	370	1	442	2	406	1	478	2
	167	6	371	6	443	5	407	3	479	10
	168	3	372	9	444	6	408	11	480	12
3	plot	trt.	plot	trt.	plot	trt.	plot	trt.	plot	trt.
	241	5	373	10	445	2	409	10	481	1
	242	8	374	1	446	7	410	7	482	3
	243	9	375	12	447	6	411	9	483	11
	244	10	376	8	448	9	412	4	484	9
	245	6	377	3	449	1	413	11	485	8
	246	2	378	5	450	10	414	8	486	5
	247	1	379	2	451	8	415	6	487	6
	248	11	380	4	452	11	416	3	488	7
	249	7	381	7	453	3	417	12	489	2
	250	3	382	11	454	5	418	2	490	12
	251	4	383	6	455	12	419	1	491	10
	252	12	384	9	456	4	420	5	492	4

APPENDIX 1

Vine Weevil: Phytotoxicity screening of suSCon Green in different growing media

Trial Layout – Year 2 (1993/94)



Plot = 5 recorded plants & 2 guards

x o o o o o x

APPENDIX 1

Vine Weevil: Phototoxicity screening of suscon green in different growing media

Randomisation - Year 2 (1993/94) - *Elaeagnus ebbingei*

REP 1		REP 2		REP 3	
Plot	Trt	Plot	Trt	Plot	Trt
253	7	289	14	325	25
254	15	290	3	326	6
255	22	291	24	327	13
256	1	292	8	328	2
257	28	293	21	329	17
258	6	294	29	330	24
259	24	295	19	331	10
260	17	296	27	332	12
261	32	297	36	333	20
262	21	298	5	334	31
263	13	299	15	335	18
264	35	300	12	336	1
265	3	301	18	337	11
266	31	302	28	338	35
267	8	303	20	339	30
268	16	304	6	340	5
269	36	305	32	341	26
270	5	306	10	342	22
271	26	307	13	343	34
272	12	308	33	344	7
273	30	309	2	345	29
274	20	310	23	346	19
275	2	311	9	347	15
276	23	312	1	348	32
277	9	313	26	349	3
278	33	314	16	350	9
279	18	315	4	351	27
280	11	316	34	352	16
281	25	317	22	353	8
282	14	318	31	354	33
283	27	319	17	355	23
284	4	320	35	356	36
285	34	321	25	357	4
286	29	322	7	358	28
287	10	323	30	359	14
288	19	324	11	360	21

APPENDIX 1

Vine Weevil: Phytotoxicity screening of suscon green in different growing media

Randomisation - Year 2 (1993/94) - other HNS species

REP	HYPERICUM		POTENTILLA		CALLUNA		ERICA		CL ELWOODS GOLD		AZALEA		COTONEASTER	
	Plot	Trt	Plot	Trt	Plot	Trt	Plot	Trt	Plot	Trt	Plot	Trt	Plot	Trt
1	1	6	37	2	73	3	109	10	145	9	181	12	217	6
	2	1	38	9	74	10	110	2	146	4	182	3	218	2
	3	10	39	11	75	2	111	5	147	6	183	1	219	11
	4	5	40	8	76	9	112	1	148	2	184	7	220	5
	5	12	41	6	77	7	113	9	149	12	185	2	221	9
	6	9	42	1	78	11	114	4	150	10	186	8	222	4
	7	2	43	10	79	8	115	12	151	3	187	5	223	10
	8	7	44	4	80	5	116	6	152	7	188	11	224	1
	9	3	45	12	81	1	117	8	153	1	189	10	225	8
	10	11	46	5	82	12	118	3	154	11	190	4	226	7
	11	8	47	3	83	4	119	7	155	5	191	6	227	3
	12	4	48	7	84	6	120	11	156	8	192	9	228	12
2	13	5	49	12	85	4	121	6	157	2	193	3	229	10
	14	2	50	8	86	12	122	1	158	6	194	11	230	1
	15	9	51	5	87	3	123	10	159	7	195	2	231	12
	16	4	52	2	88	6	124	7	160	1	196	8	232	5
	17	11	53	10	89	1	125	3	161	11	197	9	233	8
	18	1	54	3	90	9	126	12	162	8	198	10	234	3
	19	10	55	6	91	7	127	2	163	4	199	1	235	11
	20	7	56	4	92	11	128	9	164	10	200	5	236	6
	21	3	57	11	93	5	129	8	165	3	201	6	237	4
	22	6	58	7	94	8	130	4	166	9	202	12	238	9
	23	12	59	1	95	2	131	11	167	5	203	4	239	7
	24	8	60	9	96	10	132	5	168	12	204	7	240	2
3	25	7	61	9	97	8	133	1	169	5	205	11	241	3
	26	3	62	6	98	1	134	7	170	4	206	5	242	7
	27	12	63	11	99	5	135	4	171	2	207	9	243	11
	28	9	64	1	100	6	136	10	172	11	208	10	244	8
	29	2	65	3	101	10	137	9	173	6	209	4	245	2
	30	4	66	8	102	2	138	5	174	10	210	12	246	10
	31	6	67	10	103	7	139	11	175	12	211	8	247	5
	32	8	68	7	104	4	140	12	176	1	212	3	248	9
	33	10	69	12	105	11	141	6	177	9	213	2	249	12
	34	5	70	4	106	3	142	2	178	8	214	6	250	1
	35	11	71	2	107	9	143	8	179	3	215	7	251	4
	36	1	72	5	108	12	144	3	180	7	216	1	252	6

APPENDIX 1

Vine Weevil: Phytotoxicity screening of suSCon Green in different growing media

Randomisation – Year 2 (1993/94) – Alpine & Herbaceous Species

REP	PHLOX		AUBRETIA		ARABIS		MOSSY SAXIFRAGE		DIANTHUS		SEDUM	
	Plot	Trt	Plot	Trt	Plot	Trt	Plot	Trt	Plot	Trt	Plot	Trt
1	361	5	397	1	433	6	469	10	505	4	541	8
	362	10	398	6	434	9	470	4	506	11	542	5
	363	2	399	12	435	1	471	7	507	2	543	3
	364	6	400	3	436	11	472	2	508	9	544	10
	365	11	401	9	437	3	473	6	509	8	545	2
	366	4	402	7	438	8	474	9	510	12	546	1
	367	1	403	2	439	4	475	5	511	3	547	9
	368	8	404	5	440	12	476	1	512	6	548	7
	369	12	405	11	441	5	477	12	513	10	549	11
	370	3	406	8	442	7	478	11	514	5	550	6
	371	7	407	4	443	10	479	3	515	1	551	12
	372	9	408	10	444	2	480	8	516	7	552	4
2	373	7	409	5	445	8	481	9	517	2	553	10
	374	1	410	7	446	4	482	2	518	6	554	9
	375	11	411	3	447	12	483	11	519	10	555	3
	376	8	412	11	448	2	484	6	520	8	556	12
	377	2	413	6	449	7	485	1	521	1	557	8
	378	9	414	9	450	10	486	3	522	5	558	4
	379	10	415	12	451	5	487	8	523	11	559	7
	380	4	416	2	452	11	488	4	524	9	560	2
	381	6	417	8	453	1	489	12	525	7	561	5
	382	3	418	10	454	9	490	5	526	3	562	6
	383	12	419	1	455	3	491	10	527	12	563	1
	384	5	420	4	456	6	492	7	528	4	564	11
3	385	4	421	3	457	7	493	1	529	3	565	12
	386	11	422	10	458	1	494	9	530	4	566	2
	387	2	423	5	459	6	495	8	531	10	567	11
	388	8	424	1	460	11	496	6	532	2	568	4
	389	6	425	8	461	2	497	5	533	12	569	6
	390	3	426	4	462	10	498	11	534	7	570	3
	391	12	427	11	463	3	499	2	535	9	571	10
	392	10	428	7	464	9	500	7	536	11	572	5
	393	9	429	12	465	8	501	4	537	5	573	9
	394	5	430	9	466	12	502	12	538	6	574	8
	395	1	431	2	467	4	503	10	539	1	575	7
	396	7	432	6	468	5	504	3	540	8	576	1

APPENDIX II
Table 8

Year 1: *Elaeagnus ebbingei* - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1to5) (5=greatest)	10 Week (16.6.92) Phyto Score per plot (0to3) (3=most)	20 Week (25.8.92) Size Score (1to5) (5=largest)	20 Week (25.8.92) Colour Score (1to3) (3=darkest)	Final (27.5.93) Size Score (1to5) (5=largest)	Final (27.5.93) Chlorosis Score (1to4) (4=most)	Final (27.5.93) % Root cover over pot-ball	Final (27.5.93) Dry Weight (g)
1	WB	Nil	2.60	1.3	1.53	2.73	2.95	1.22	17.6	21.4
2	WB	1.0	1.73	2.0	1.07	2.13	2.32	1.36	15.4	17.8
3	WB	1.25	2.13	2.0	1.40	2.27	2.37	1.25	21.1	20.4
4	WB	1.5	3.00	2.0	1.40	1.20	1.62	2.80	9.9	12.6
5	CB	Nil	2.20	0.7	1.47	3.00	2.90	1.43	16.8	21.9
6	CB	1.0	2.47	1.3	1.53	1.87	2.08	1.30	16.9	15.1
7	CB	1.25	2.60	1.7	1.13	1.40	2.20	1.73	17.3	14.7
8	CB	1.5	2.13	0.3	1.20	1.67	1.97	2.05	10.8	13.6
9	PB	Nil	2.73	0.3	2.80	2.27	4.13	1.27	36.0	33.2
10	PB	1.0	2.87	0.3	2.87	2.20	4.13	1.20	27.7	29.6
11	PB	1.25	2.80	0.7	2.47	2.07	3.93	1.40	28.0	25.9
12	PB	1.5	3.07	0.0	3.07	2.33	3.80	1.80	30.3	27.0
13	Coir	Nil	3.13	1.3	2.20	2.47	4.00	1.27	30.7	33.1
14	Coir	1.0	2.20	0.7	1.73	1.73	2.80	1.33	18.7	19.9
15	Coir	1.25	2.27	1.0	1.33	1.67	2.80	1.35	14.0	17.9
16	Coir	1.5	1.93	0.7	1.53	2.27	2.67	1.27	15.3	17.6
17	CP75	Nil	2.60	1.3	2.00	2.73	3.65	1.28	20.7	25.4
18	CP75	1.0	2.53	1.3	1.47	2.13	3.07	1.60	20.2	19.9
19	CP75	1.25	2.20	1.0	1.60	2.27	2.80	1.27	20.7	21.4
20	CP75	1.5	2.53	0.7	1.80	2.00	2.73	1.60	23.0	19.0
21	CP50	Nil	2.20	0.0	1.93	2.53	3.47	1.60	28.2	25.9
22	CP50	1.0	2.07	0.3	1.27	2.60	2.75	1.37	23.5	18.8
23	CP50	1.25	2.27	0.3	2.33	2.53	3.93	1.80	35.0	24.5
24	CP50	1.5	2.40	1.7	1.67	2.73	2.60	2.00	20.7	18.1
25	CP25	Nil	2.13	0.0	2.07	2.13	3.58	1.33	30.1	28.2
26	CP25	1.0	2.00	0.3	1.73	2.40	3.17	1.20	20.6	19.5
27	CP25	1.25	2.27	0.7	2.13	2.20	3.60	1.07	23.7	22.8
28	CP25	1.5	2.27	0.7	3.07	2.87	4.00	1.80	34.3	29.7
29	Peat	Nil	2.93	0.7	3.20	2.13	4.73	1.00	34.6	35.1
30	Peat	1.0	2.27	0.3	1.93	2.13	3.87	1.20	30.3	24.0
31	Peat	1.25	2.73	0.7	2.07	2.40	3.40	1.33	19.0	20.6
32	Peat	1.5	1.87	1.3	1.80	2.47	2.93	1.93	24.2	19.9
	d.f =62	*SED*= ±	*0.375*	*0.65*	*0.317*	*0.263*	*0.468*	*0.306*	*5.80*	*3.37*
		LSD (5%)=±	*0.75*	*1.3*	*0.63*	*0.53*	*0.94*	*0.61*	*11.6*	*6.7*

Key: **WB**=Woodfibre/bark **CB**=Mixed conifer bark **PB**=Peat/Cambark 100 **CP75**=75% Coir : Peat **CP50**=50% Coir : Peat **CP25**= 25% Coir : Peat
Phyto = Phytotoxicity

APPENDIX II

Table 9 **Year 1: *Eleagnus ebbingei* - Moss and Liverwort infestation in containers by 19 July 1993**

(figures are a mean of replicates 2 and 3, 5 plants/plot)

Treatment No.	Media	suSCon Green (kg/m^3)	% Moss cover/pot	%Liverwort cover/pot
1	WB	Nil	35.0	40.0
2	WB	1.0	17.5	60.0
3	WB	1.25	27.5	45.0
4	WB	1.5	27.5	55.0
5	CB	Nil	7.5	7.5
6	CB	1.0	5.0	7.5
7	CB	1.25	5.0	3.5
8	CB	1.5	1.0	5.0
9	PB	Nil	97.5	0.0
10	PB	1.0	97.5	0.0
11	PB	1.25	100.0	0.0
12	PB	1.5	85.0	0.0
13	Coir	Nil	95.0	0.0
14	Coir	1.0	95.0	0.0
15	Coir	1.25	95.0	0.0
16	Coir	1.5	75.0	2.5
17	CP75	Nil	92.5	0.0
18	CP75	1.0	95.0	0.0
19	CP75	1.25	87.5	3.5
20	CP75	1.5	90.0	0.0
21	CP50	Nil	100.0	0.0
22	CP50	1.0	95.0	0.0
23	CP50	1.25	77.5	0.0
24	CP50	1.5	85.0	0.0
25	CP25	Nil	87.5	0.0
26	CP25	1.0	90.0	0.0
27	CP25	1.25	85.0	0.0
28	CP25	1.5	92.5	0.0
29	Peat	Nil	95.0	0.0
30	Peat	1.0	82.5	0.0
31	Peat	1.25	95.0	0.0
32	Peat	1.5	87.5	0.0

Key: **WB**=Woodfibre/Bark **CB**=Mixed Conifer Bark **PB**=Peat/Cambark 100 **CP75**=75% Coir:Peat **CP50**=50% Coir:Peat **CP25**=25% Coir:Peat

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Table 10

Year 1: *Azalea* 'Rosebud' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No.	Media	suSCon Green (kg/m^3)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	20 Week (25.8.92) Colour Score (1to3) (3=darkest)	(29.3.93) Dry Weight Prunings (g/plot)	Final (6.7.93) Size Score (1,3,5) (5=largest)	Final (6.7.93) Colour Score (1,2) (2=darkest)	Final (6.7.93) % Root cover over pot-ball	Final (6.7.93) % Plants dead	Final (6.7.93) Dry Weight (g)
1	**PB**	**Nil**	3.13	1.73	18.06	3.89	1.93	51.8	14	53.7
2	**PB**	**1.0**	3.67	2.67	28.27	3.67	1.87	20.0	0	49.7
3	**PB**	**1.25**	2.20	2.33	16.70	3.67	1.73	25.0	0	50.8
4	**PB**	**1.5**	3.53	2.00	15.23	4.07	1.43	19.7	6	47.0
5	**Coir**	**Nil**	1.67	2.13	10.10	3.17	1.25	27.1	20	42.0
6	**Coir**	**1.0**	1.13	1.07	3.56	2.07	1.20	5.7	0	33.8
7	**Coir**	**1.25**	1.40	1.53	3.70	2.33	1.07	10.7	0	33.9
8	**Coir**	**1.5**	1.40	1.60	1.96	1.67	1.20	5.0	0	27.3
9	**Peat**	**Nil**	3.13	2.20	15.49	3.44	1.33	52.2	54	41.1
10	**Peat**	**1.0**	3.40	1.93	19.25	3.27	1.93	26.0	0	48.3
11	**Peat**	**1.25**	2.73	2.07	14.75	3.47	1.83	17.3	14	50.0
12	**Peat**	**1.5**	3.13	1.87	17.27	4.07	1.93	17.1	0	47.7
	d.f=22	*SED=±*	*0.568*	*0.251*	*0.671*	*0.163*	*8.38*	*0.44*		*4.82*
		LSD (5%)= ±	*1.18*	*0.52*	*1.39*	*0.34*	*17.4*	*0.9*		*10.0*

Key: **PB** = 75% Peat : 25% Cambark 100

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Table 11 — Year 1: *Erica Carnea* 'King George' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1,3,5) (5=greatest)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	Final (6.7.93) Size Score (1to5) (5=largest)	Final (6.7.93) % Root cover over pot-ball	Final (6.7.93) Mean No. surviving plants/plot (Max.5)	Final (6.7.93) Dry Weight (g)
1	**PB**	**Nil**	3.53	4.08	3.17	30.1	3.0	6.3
2	**PB**	**1.0**	3.67	3.78	3.04	18.9	4.3	5.6
3	**PB**	**1.25**	3.13	3.05	2.87	18.2	4.7	4.4
4	**PB**	**1.5**	2.47	2.73	3.07	26.2	4.7	4.6
5	**Coir**	**Nil**	2.60	2.72	2.50	28.4	4.0	4.8
6	**Coir**	**1.0**	1.67	1.73	1.93	14.7	5.0	3.6
7	**Coir**	**1.25**	1.53	1.37	1.00	8.8	4.3	3.0
8	**Coir**	**1.5**	2.33	1.80	1.13	13.6	4.7	3.3
9	**Peat**	**Nil**	2.60	4.13	3.67	34.7	4.0	5.1
10	**Peat**	**1.0**	2.87	3.00	2.77	29.3	4.7	4.2
11	**Peat**	**1.25**	3.00	3.20	3.13	16.3	5.0	4.6
12	**Peat**	**1.5**	3.27	3.22	2.83	15.1	4.7	4.9
d.f.=22	*SED = ±*		*0.474*	*0.581*	*0.641*	*5.53*	*0.60*	*0.55*
	LSD(5%) = ±		*0.98*	*1.20*	*1.33*	*11.5*	*1.2*	*1.1*

Key: **PB** = 75% Peat : 25% Cambark 100

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Table 12 — Year 1: *Ceanothus* 'Autumnal Blue' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1to5) (5=greatest)	10 Week (16.6.92) Phyto Score per plot (0to3) (3=most)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	20 Week (25.8.92) Colour Score per plot (1to3) (3=darkest)	(29.3.93) Dry Wt. of Prunings (g/plot)	Final (27.5.93) Size Score (1,3,5) (5=largest)	Final (27.5.93) % Root cover over pot-ball	Final (27.5.93) Flower Score (0 = no flowers 1=floral)	Final (27.5.93) Dry Weight (g)
1	**PB**	**Nil**	4.20	0.3	4.73	3.00	21.27	4.00	57.9	0.92	70.0
2	**PB**	**1.0**	3.33	0.3	4.33	2.33	18.37	3.53	46.2	0.87	68.9
3	**PB**	**1.25**	3.73	1.0	4.07	2.00	18.37	3.00	58.0	0.73	61.0
4	**PB**	**1.5**	3.67	0.0	4.20	2.00	18.70	4.07	54.7	0.87	68.8
5	**Coir**	**Nil**	2.87	1.0	2.87	2.67	13.79	3.07	47.7	0.72	66.1
6	**Coir**	**1.0**	2.33	2.0	2.47	2.00	7.50	2.73	34/7	0.07	56.1
7	**Coir**	**1.25**	2.13	1.3	2.20	2.00	6.48	2.87	23.0	0.33	62.2
8	**Coir**	**1.5**	2.13	2.0	1.80	2.67	4.73	2.20	12.0	0.27	42.1
9	**Peat**	**Nil**	3.20	0.0	4.87	2.33	21.27	3.49	65.6	0.83	72.7
10	**Peat**	**1.0**	3.20	0.0	4.73	1.33	20.61	3.67	53.3	0.67	68.9
11	**Peat**	**1.25**	2.87	0.3	4.60	2.00	18.77	3.40	52.2	0.80	67.4
12	**Peat**	**1.5**	3.27	0.7	3.80	1.00	13.41	3.53	47.7	0.87	62.1
d.f=22	*SED = ±*		*0.564*	*0.64*	*0.375*	*0.521*		*0.547*	*6.66*	*0.213*	*6.32*
	LSD(5%) = ±		*1.17*	*1.3*	*0.78*	*1.08*		*1.13*	*13.8*	*0.44*	*13.1*

Key: **PB** = 75% Peat : 25% Cambark 100
Phyto = Phytotoxicity

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Table 13 Year 1: *Potentilla fruticosa* 'Tangerine' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No.	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1to5) (5=greatest)	20 Week (8.92) Size Score (1,3,5) (5=largest)	Final (7.7.93) Size Score (1,3,5) (5=largest)	Final (7.7.93) Flower Score (0to3) (3=most)	Final (7.7.93) % Root cover over pot-ball	Final (7.7.93) Dry Weight (g)
1	**PB**	**Nil**	2.20	4.33	3.20	1.43	21.2	28.7
2	**PB**	**1.0**	2.67	3.40	4.07	2.40	27.0	32.2
3	**PB**	**1.25**	2.40	2.87	3.93	2.13	26.7	31.8
4	**PB**	**1.5**	2.00	3.27	3.53	2.53	25.0	31.9
5	**Coir**	**Nil**	2.40	3.13	3.17	1.60	30.9	30.7
6	**Coir**	**1.0**	2.27	3.53	3.13	1.47	16.7	29.6
7	**Coir**	**1.25**	2.20	2.47	3.27	1.67	12.0	27.7
8	**Coir**	**1.5**	1.87	3.27	3.53	2.07	16.3	28.8
9	**Peat**	**Nil**	2.27	3.93	2.28	0.92	9.4	21.3
10	**Peat**	**1.0**	3.00	3.27	4.07	2.40	27.0	35.3
11	**Peat**	**1.25**	2.13	2.73	4.47	2.73	23.3	37.5
12	**Peat**	**1.5**	2.67	3.27	3.53	2.13	24.3	31.9
d.f=22		*SED = ±*	*0.373*	*0.595*	*0.685*	*0.428*	*4.64*	*4.51*
		LSD (5%) =±	*0.77*	*1.23*	*1.42*	*0.89*	*9.6*	*9.3*

Key: **PB** = 75% Peat : 25% Cambark 100

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Table 14 — Year 1: *Pyracantha* 'Orange Glow' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1,3,5) (5=greatest)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	Final (5.7.93) Size Score (1to5) (5=largest)	Final (5.7.93) % Root cover over pot-ball	Final (5.7.93) Mean No. surviving plants/plot (Max.5)	Final (5.7.93) Dry Weight (g)
1	**PB**	**Nil**	3.67	4.33	3.22	28.0	3.7	34.1
2	**PB**	**1.0**	2.60	4.33	3.47	28.0	5.0	33.2
3	**PB**	**1.25**	1.80	3.80	2.80	23.7	5.0	29.1
4	**PB**	**1.5**	3.13	4.33	3.27	27.3	5.0	28.3
5	**Coir**	**Nil**	2.60	4.07	2.92	27.9	4.0	25.8
6	**Coir**	**1.0**	1.80	2.60	2.87	45.7	5.0	31.2
7	**Coir**	**1.25**	2.33	3.13	2.93	36.3	5.0	25.7
8	**Coir**	**1.5**	2.60	3.80	3.53	34.7	5.0	32.0
9	**Peat**	**Nil**	2.60	4.20	2.83	24.2	1.7	40.3
10	**Peat**	**1.0**	3.80	4.33	3.67	24.0	5.0	32.8
11	**Peat**	**1.25**	2.20	3.80	3.33	21.0	5.0	34.3
12	**Peat**	**1.5**	1.13	3.53	3.07	18.7	5.0	30.0
d.f=22	*SED = ±*		*0.419*	*0.468*	*0.333*	*5.17*	*0.37*	*4.71*
	LSD (5%) = ±		*0.87*	*0.97*	*0.69*	*10.7*	*0.8*	*9.8*

Key: **PB** = 75% Peat : 25% Cambark 100

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Table 15 — Year 1: *Viburnum tinus* - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No.	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1to5) (5=greatest)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	Final (7.7.93) Size Score (1,3,5) (5=largest)	Chlorosis Score (1to3) (3=most)	% Root cover over pot-ball	Dry Weight (g)
1	PB	Nil	2.93	3.27	4.33	1.67	16.7	59.0
2	PB	1.0	3.13	3.40	3.80	1.67	20.7	53.7
3	PB	1.25	3.20	4.33	4.07	2.00	21.7	56.4
4	PB	1.5	3.07	3.40	2.73	3.00	16.0	37.7
5	Coir	Nil	3.20	2.60	3.80	1.00	17.0	54.3
6	Coir	1.0	2.73	1.13	2.73	1.00	6.3	35.5
7	Coir	1.25	2.67	2.87	3.80	1.00	11.7	50.7
8	Coir	1.5	2.13	1.40	2.47	1.33	8.7	39.0
9	Peat	Nil	3.53	3.40	3.67	1.00	12.7	54.4
10	Peat	1.0	2.60	3.67	2.80	2.33	14.3	35.5
11	Peat	1.25	2.67	3.80	2.33	2.67	8.7	38.1
12	Peat	1.5	2.33	3.27	1.93	2.67	8.7	38.1
d.f.=22	*SED = ±*		*0.426*	*0.498*	*0.442*	*0.400*	*1.98*	*5.69*
	LSD(5%) = ±		*0.88*	*1.03*	*0.92*	*0.83*	*4.1*	*11.8*

Key: **PB** = 75% Peat : 25% Cambark 100

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Table 16 Year 1: *Chamaecyparis lawsoniana* 'Stardust' - Growth Records

(figures are a mean of 3 replicates, 4 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1,3,5) (5=greatest)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	Final (5.7.93) Size Score (1,3,5) (5=largest)	Final (5.7.93) % Root cover over pot-ball	Final (5.7.93) Dry Weight (g)
1	**PB**	**Nil**	2.73	3.13	2.87	29.3	66.8
2	**PB**	**1.0**	2.73	1.93	2.60	37.7	65.9
3	**PB**	**1.25**	2.47	3.93	3.53	34.0	66.8
4	**PB**	**1.5**	2.07	2.47	2.60	32.7	64.0
5	**Coir**	**Nil**	1.80	2.07	2.07	24.8	53.3
6	**Coir**	**1.0**	2.47	2.07	2.73	31.7	60.0
7	**Coir**	**1.25**	2.07	2.07	2.47	30.0	60.1
8	**Coir**	**1.5**	2.73	2.33	1.93	32.3	57.6
9	**Peat**	**Nil**	3.00	4.07	2.73	36.3	73.0
10	**Peat**	**1.0**	3.40	3.80	3.40	26.0	72.1
11	**Peat**	**1.25**	2.73	3.80	3.13	28.0	71.5
12	**Peat**	**1.5**	3.27	3.40	3.13	26.3	63.4
d.f=22	*SED = ±*		*0.601*	*0.545*	*0.475*	*4.79*	*4.37*
	LSD (5%) = ±		*1.24*	*1.13*	*0.98*	*9.9*	*9.1*

Key: **PB** = 75% Peat : 25% Cambark 100

APPENDIX II

Table 17 — Year 1: *Astilbe* 'Joe Ophurst' - Growth Records

(figures are a mean of 3 replicates , 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1to5) (5=greatest)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	20 Week (25.8.92) Colour Score (1to3) (3=darkest)	Final (28.5.93) Size Score (1,3,5) (5=largest)	Final (28.5.93) Mean No. Flower Spikes per plant	Final (28.5.93) % Root cover over pot-ball	Final (28.5.93) Dry Weight (g)
1	**PB**	**Nil**	3.93	3.80	2.07	3.67	0.47	55.7	43.9
2	**PB**	**1.0**	3.67	3.67	2.27	3.40	0.60	55.0	37.8
3	**PB**	**1.25**	3.73	3.27	2.27	3.80	1.40	76.7	45.7
4	**PB**	**1.5**	3.47	3.13	2.07	2.60	0.53	64.7	35.3
5	**Coir**	**Nil**	3.53	3.67	2.07	4.07	1.20	48.7	47.0
6	**Coir**	**1.0**	3.27	3.67	1.80	3.27	0.93	79.0	43.6
7	**Coir**	**1.25**	3.07	2.67	2.03	2.47	0.13	53.9	34.4
8	**Coir**	**1.5**	2.80	2.60	2.00	2.83	0.35	62.3	32.2
9	**Peat**	**Nil**	3.93	3.67	2.13	3.27	0.47	62.0	41.2
10	**Peat**	**1.0**	3.73	3.53	2.33	3.40	0.33	76.0	43.3
11	**Peat**	**1.25**	4.00	3.53	2.27	3.00	0.53	65.0	35.9
12	**Peat**	**1.5**	4.07	3.27	2.53	2.73	0.00	63.3	34.9
d.f=22	*SED = ±*		*0.489*	*0.625*	*0.251*	*0.413*	*0.454*	*7.61*	*4.56*
	LSD(5%) = ±		*1.01*	*1.29*	*0.52*	*0.86*	*0.94*	*15.8*	*9.4*

Key: **PB** = 75% Peat : 25% Cambark 100

APPENDIX II

Table 18

Year 1: *Bergenia* 'Sunningdale' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1to5) (5=greatest)	10 Week (16.6.92) Phyto Score per plot (0to3) (3=most)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	Final (27.5.93) Size Score (1to5) (5=largest)	Final (27.5.93) Mean No. Flower Spikes	Final (27.5.93) % Root cover over pot-ball	Final (27.5.93) Dry Weight (g)
1	**PB**	**Nil**	3.60	0.0	4.07	4.13	1.07	88.0	86.2
2	**PB**	**1.0**	3.40	0.0	3.80	3.93	0.93	87.3	73.7
3	**PB**	**1.25**	3.73	0.7	4.33	3.93	1.00	86.7	75.7
4	**PB**	**1.5**	3.33	0.3	3.13	3.53	1.67	90.7	57.2
5	**Coir**	**Nil**	2.87	1.7	2.33	4.07	0.80	80.0	73.2
6	**Coir**	**1.0**	3.27	1.0	2.47	3.33	1.33	70.0	63.9
7	**Coir**	**1.25**	2.47	1.7	1.27	2.47	1.53	63.3	51.8
8	**Coir**	**1.5**	2.87	1.3	1.13	2.40	1.33	42.7	43.4
9	**Peat**	**Nil**	4.27	1.0	4.07	4.27	0.93	88.7	89.1
10	**Peat**	**1.0**	3.60	0.7	3.80	3.93	0.87	84.0	72.7
11	**Peat**	**1.25**	3.60	1.0	3.40	4.00	1.33	86.0	72.5
12	**Peat**	**1.5**	3.87	0.7	3.53	3.53	1.13	85.3	66.0
d.f.=22	*SED = ±*		*0.452*	*0.56*	*0.492*	*0.278*	*0.560*	*8.47*	*5.33*
	LSD (5%) = ±		*0.94*	*1.2*	*1.02*	*0.57*	*1.16*	*17.5*	*11.0*

Key: **PB** = 75% Peat : 25% Cambark 100
Phyto = Phytoxicity

APPENDIX II

Table 19

Year 1: *Heuchera* 'Palace Purple' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	10 Week (16.6.92) Vigour Score (1,3,5) (5=greatest)	20 Week (25.8.92) Size Score (1,3,5) (5=largest)	Final (27.5.93) Size Score (1to5) (5=largest)	Final (27.5.93) % Root cover over pot-ball	Final (27.5.93) Dry Weight (g)
1	**PB**	**Nil**	4.20	4.07	2.93	26.7	50.5
2	**PB**	**1.0**	3.27	3.90	3.77	26.8	58.0
3	**PB**	**1.25**	3.00	3.67	3.93	20.3	68.6
4	**PB**	**1.5**	2.87	3.53	3.27	24.3	47.7
5	**Coir**	**Nil**	3.53	2.87	3.35	30.4	51.1
6	**Coir**	**1.0**	4.13	3.93	4.00	27.7	59.4
7	**Coir**	**1.25**	2.20	3.13	4.00	16.7	48.7
8	**Coir**	**1.5**	3.13	3.40	3.87	20.0	59.7
9	**Peat**	**Nil**	3.53	3.93	3.40	25.7	50.0
10	**Peat**	**1.0**	2.73	3.53	3.53	18.7	45.2
11	**Peat**	**1.25**	2.47	3.67	3.80	17.0	49.9
12	**Peat**	**1.5**	3.13	3.40	3.68	19.1	50.6
d.f.=22	*SED = ±*		*0.622*	*0.623*	*0.524*	*7.10*	*7.00*
	LSD (5%) = ±		*1.29*	*1.29*	*1.09*	*14.7*	*14.5*

Key: **PB** = 75% Peat : 25% Cambark 100

APPENDIX II

Table 20 — Year 1: *Hosta* 'Honey Bells' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No.	Media	suSCon Rate (kg/m^3)	10 Week 16.6.92		20 Week 25.8.92		Final 27.5.93		
			Vigour Score (1,3,5) (5=greatest)	Phyto. Score per plot (3=most)	Size Score 1,3,4) (5=largest)	Colour Score (1,2) (2=darkest)	Size Score (1,3,5) (5=largest)	% Root cover over pot-ball	Dry Weight (g)
1	**PB**	**Nil**	3.73	2.0	3.93	1.53	2.33	50.0	34.2
2	**PB**	**1.0**	3.60	2.0	3.40	1.47	3.27	38.7	33.9
3	**PB**	**1.25**	3.67	1.3	3.40	1.53	3.13	40.0	37.5
4	**PB**	**1.5**	3.40	2.3	3.53	1.73	1.93	40.3	35.7
5	**Coir**	**Nil**	3.53	0.7	4.60	1.27	2.20	53.3	33.6
6	**Coir**	**1.0**	3.13	0.7	1.93	1.40	2.07	21.3	27.7
7	**Coir**	**1.25**	3.60	1.0	2.20	1.53	2.60	21.3	31.1
8	**Coir**	**1.5**	3.27	0.3	2.20	1.53	2.60	24.7	36.6
9	**Peat**	**Nil**	3.73	0.0	4.60	1.47	2.87	52.3	35.9
10	**Peat**	**1.0**	3.40	0.3	3.53	1.33	3.13	38.3	37.1
11	**Peat**	**1.25**	4.27	0.7	3.40	1.33	3.67	39.7	38.9
12	**Peat**	**1.5**	3.40	1.0	2.73	1.60	2.20	30.7	33.2
d.f.=22	*SED = ±*		*0.479*	*0.70*	*0.573*	*0.198*	*0.478*	*4.69*	*4.70*
	LSD (5%) = ±		*0.99*	*1.5*	*1.19*	*0.41*	*0.99*	*9.7*	*9.7*

Key: **PB** = 75% Peat:25% Cambark 100

APPENDIX III

Table 21 Year 2: *Elaeagnus ebbingei* - Growth Records for 19 November 1993

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	19.11.93 Size Score (1to5) (5=largest)	Colour Score (1,2) (2=darkest)	Vigour Score (1to3) (3=greatest)
1	WB	Nil	3.27	1.93	2.2
2	WB	1.0	3.07	2.00	2.2
3	WB	1.25	3.00	1.93	2.1
4	WB	1.5	2.40	1.60	1.7
5	CB	Nil	3.80	2.00	2.4
6	CB	1.0	3.00	2.00	2.3
7	CB	1.25	2.93	1.93	2.2
8	CB	1.5	2.87	2.00	2.1
9	PB	Nil	3.60	2.00	2.4
10	PB	1.0	2.60	2.00	2.1
11	PB	1.25	2.40	1.87	1.9
12	PB	1.5	2.67	1.87	2.3
13	Coir	Nil	2.87	1.93	2.1
14	Coir	1.0	2.60	1.80	1.7
15	Coir	1.25	2.53	1.20	1.5
16	Coir	1.5	1.53	1.00	1.1
17	CP75	Nil	3.40	2.00	2.1
18	CP75	1.0	2.53	1.93	2.1
19	CP75	1.25	2.07	1.73	1.9
20	CP75	1.5	2.67	2.00	2.0
21	CP50	Nil	2.00	1.87	2.3
22	CP50	1.0	2.53	1.87	1.9
23	CP50	1.25	1.40	1.53	1.6
24	CP50	1.5	1.80	1.73	1.9
25	CP25	Nil	2.47	1.93	2.0
26	CP25	1.0	2.60	2.00	1.8
27	CP25	1.25	2.13	2.00	1.7
28	CP25	1.5	2.27	1.87	2.0
29	Peat	Nil	1.87	1.60	2.0
30	Peat	1.0	1.80	1.47	1.7
31	Peat	1.25	1.80	1.73	1.9
32	Peat	1.5	1.93	2.00	1.7
33	PG	Nil	2.33	1.87	2.2
34	PG	1.0	1.93	1.73	1.7
35	PG	1.25	2.20	1.93	1.7
36	PG	1.5	2.27	1.93	1.9
d.f.=70	*SED = ±*		*0.367*	*0.149*	*0.20*
	LSD(5%) = ±		*0.73*	*0.30*	*0.4*

Key: **WB** = Woodfibre/bark **PB** = Peat/Cambark 100 **CP50** = 50% Coir/Peat **PG** = Peat/Grodan
CB = Mixed Conifer Bark **CP75** = 75% Coir : Peat **CP25** = 25% Coir/Peat

APPENDIX III

Table 21 (continued) **Year 2: *Elaeagnus ebbingei* - Growth Records for 2 June 1994**

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	2.6.94 Size Score (1to5) (5=darkest)	Foliage Density Score (1,3,5) (5=most)	Leaf Size Score (1,3,5) (5=largest)	Colour Score (1,2) (2=darkest)	% Root cover over pot-ball
1	WB	Nil	3.73	4.20	3.93	4.33	40.0
2	WB	1.0	4.13	4.73	4.87	5.00	46.7
3	WB	1.25	3.53	4.20	5.00	4.73	38.7
4	WB	1.5	3.27	3.67	4.20	3.93	31.3
5	CB	Nil	4.40	4.87	4.60	4.60	47.0
6	CB	1.0	3.93	4.47	4.60	4.60	39.0
7	CB	1.25	3.40	3.93	4.20	4.07	32.3
8	CB	1.5	3.47	3.80	4.20	3.67	35.3
9	PB	Nil	4.27	5.00	4.60	4.73	40.7
10	PB	1.0	3.60	4.87	4.73	4.33	40.0
11	PB	1.25	2.87	3.67	4.33	4.60	28.3
12	PB	1.5	3.13	4.07	4.47	4.33	32.7
13	Coir	Nil	3.20	3.53	3.00	3.53	27.7
14	Coir	1.0	3.53	3.80	4.07	3.93	38.3
15	Coir	1.25	2.87	4.07	3.80	3.80	30.3
16	Coir	1.5	1.60	3.27	3.13	3.53	14.0
17	CP75	Nil	3.80	4.73	3.67	3.93	41.0
18	CP75	1.0	3.27	4.33	4.20	4.33	31.0
19	CP75	1.25	3.13	4.47	4.33	4.47	25.3
20	CP75	1.5	2.93	4.07	3.67	3.80	28.0
21	CP50	Nil	2.52	3.87	2.47	3.40	17.8
22	CP50	1.0	3.20	4.20	4.60	4.60	28.3
23	CP50	1.25	2.07	2.87	4.07	3.93	17.0
24	CP50	1.5	2.40	3.00	4.07	4.20	20.7
25	CP25	Nil	2.67	3.93	2.47	3.67	22.3
26	CP25	1.0	3.20	3.93	4.60	3.80	30.3
27	CP25	1.25	2.93	4.20	4.07	3.93	21.3
28	CP25	1.5	2.53	3.67	4.07	3.93	19.3
29	Peat	Nil	2.67	3.40	3.67	4.47	22.0
30	Peat	1.0	2.00	3.00	4.07	3.80	17.7
31	Peat	1.25	2.20	3.00	4.33	3.80	18.3
32	Peat	1.5	2.53	3.53	4.47	4.07	21.3
33	PG	Nil	3.60	4.60	4.60	4.33	40.3
34	PG	1.0	3.33	4.07	4.47	4.73	38.3
35	PG	1.25	2.60	4.07	4.47	4.60	31.3
36	PG	1.5	2.87	3.80	4.60	4.47	35.3
d.f.=70		*SED = ±*	*0.412*	*0.424*	*0.466*	*0.454*	*4.17*
		LSD(5%) = ±	*0.82*	*0.85*	*0.93*	*0.91*	*8.3*

Key: **WB** = Woodfibre/bark **PB** = Peat/Cambark 100 **CP50** = 50% Coir/Peat **PG** = Peat/Grodan
CB = Mixed Conifer Bark **CP75** = 75% Coir : Peat **CP25** = 25% Coir/Peat

APPENDIX III

Table 22 Year 2: Japanese *Azalea* 'Blue Danube' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1to5) (5=largest)	7.12.93 Colour Score (1to3) (3=darkest)	7.6.94 Size Score (1,3,5) (5=largest)	7.6.94 Colour Score (1,3,5) (5=darkest) (1=severe chlorosis)	7.6.94 % Root cover over pot-ball
1	**PB**	**Nil**	4.07	3.00	3.48	4.57	58.3
2	**PB**	**1.0**	3.07	2.87	4.00	4.87	52.0
3	**PB**	**1.25**	3.87	3.00	3.47	4.73	43.3
4	**PB**	**1.5**	3.40	3.00	3.87	4.87	38.3
5	**Coir**	**Nil**	2.20	1.87	1.87	2.73	15.9
6	**Coir**	**1.0**	2.07	1.20	1.80	2.73	5.7
7	**Coir**	**1.25**	2.47	1.67	2.00	3.40	20.5
8	**Coir**	**1.5**	1.87	1.07	1.27	2.33	4.5
9	**Peat**	**Nil**	3.60	2.87	3.32	4.23	60.5
10	**Peat**	**1.0**	3.20	3.00	3.53	5.00	49.3
11	**Peat**	**1.25**	3.33	2.93	3.33	4.60	41.3
12	**Peat**	**1.5**	2.73	2.53	2.55	3.80	21.5
d.f.=22	*SED = ±*		*0.433*	*0.342*	*0.468*	*0.613*	*9.71*
	LSD(5%) = ±		*0.90*	*0.71*	*0.97*	*1.27*	*20.1*

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 23 **Year 2: *Erica carnea* 'Mertoun Ruby' - Growth Records**

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1to5) (5=largest)	24.6.94 Size Score (1to5) (5=largest)	24.6.94 Colour Score (1,3,5) (5=darkest)	24.6.94 % Root cover over pot-ball	24.6.94 % Plants dead
1	**PB**	**Nil**	3.42	4.23	4.53	80.3	13
2	**PB**	**1.0**	3.49	4.60	4.78	82.9	27
3	**PB**	**1.25**	3.57	4.38	5.00	73.5	13
4	**PB**	**1.5**	3.47	4.27	5.00	74.7	0
5	**Coir**	**Nil**	2.07	2.67	4.87	73.0	7
6	**Coir**	**1.0**	2.08	2.96	5.00	61.0	20
7	**Coir**	**1.25**	1.33	2.65	5.00	44.3	7
8	**Coir**	**1.5**	2.17	2.53	5.00	34.7	15
9	**Peat**	**Nil**	3.47	4.40	5.00	92.7	0
10	**Peat**	**1.0**	3.53	3.60	4.60	77.3	0
11	**Peat**	**1.25**	3.27	3.07	3.13	63.3	0
12	**Peat**	**1.5**	2.84	3.27	4.20	66.2	13
	d..f.=22	*SED =±*	*0.254*	*0.312*	*0.317*	*6.51*	
		LSD(5%) =±	*0.53*	*0.65*	*0.66*	*13.5*	

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 24

Year 2: *Calluna vulgaris* 'Firefly' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1to5) (5=largest)	7.12.93 Colour Score (1to3) (3=bright red)	24.6.94 Size Score (1to5) (5=largest)	24.6.94 Colour Score (1,3,5) (5=darkest)	24.6.94 % Root cover over pot-ball	24.6.94 % Plants dead
1	**PB**	**Nil**	3.53	1.87	4.31	3.62	87.0	13
2	**PB**	**1.0**	4.43	2.03	4.62	4.20	87.3	13
3	**PB**	**1.25**	4.07	2.20	4.09	3.31	74.0	27
4	**PB**	**1.5**	4.33	1.80	4.03	3.83	73.7	7
5	**Coir**	**Nil**	2.87	2.67	2.27	1.93	36.3	0
6	**Coir**	**1.0**	2.80	1.93	3.64	4.07	69.0	13
7	**Coir**	**1.25**	2.00	1.73	2.93	3.80	66.3	0
8	**Coir**	**1.5**	1.77	1.42	2.68	3.30	45.8	7
9	**Peat**	**Nil**	3.27	1.87	3.73	3.13	69.0	27
10	**Peat**	**1.0**	3.53	1.47	4.37	4.43	77.8	7
11	**Peat**	**1.25**	3.33	1.67	3.20	3.13	65.3	0
12	**Peat**	**1.5**	3.00	2.07	3.67	3.53	58.0	0
	d.f.=22	*SED = ±*	*0.307*	*0.240*	*0.488*	*0.558*	*12.29*	
		LSD (5%) = ±	*0.64*	*0.50*	*1.01*	*1.16*	*25.4*	

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 25

Year 2: *Cotoneaster* 'Cornubia' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1,3,5) (5=largest)	2.6.94 Size Score (1to5) (5=largest)	Shoot Score (1,3,5) (5=most 2° branches)	Flower Score (1,3,5) (5=most)	% Root cover over pot-ball	% Plants dead
1	**PB**	**Nil**	3.40	3.13	3.27	2.73	88.3	0
2	**PB**	**1.0**	2.87	3.00	3.13	3.53	92.0	0
3	**PB**	**1.25**	3.13	3.27	2.33	3.53	90.7	0
4	**PB**	**1.5**	2.47	3.00	3.00	3.93	93.7	0
5	**Coir**	**Nil**	3.00	3.67	2.93	2.87	70.3	13
6	**Coir**	**1.0**	2.73	3.13	2.87	3.67	93.3	0
7	**Coir**	**1.25**	2.47	3.00	3.80	3.27	90.7	0
8	**Coir**	**1.5**	1.80	3.60	2.60	2.60	89.7	0
9	**Peat**	**Nil**	3.13	3.47	2.87	3.27	81.7	8
10	**Peat**	**1.0**	2.20	3.40	3.67	2.47	93.0	0
11	**Peat**	**1.25**	2.07	3.00	2.60	3.00	89.3	0
12	**Peat**	**1.5**	2.33	2.53	2.87	3.27	88.7	0
	d.f.=22	*SED = ±*	*0.361*	*0.475*	*0.510*	*0.375*	*3.38*	
		LSD(5%) = ±	*0.75*	*0.98*	*1.06*	*0.78*	*7.0*	

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 26

Year 2: *Hypericum* 'Hidcote' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No.	Media	suSCon Green (kg/m^3)	7.12.93		27.5.94			
			Size Score (1to5) (5=largest)	Colour Score (1to3) (3=darkest)	Size Score (1to5) (5=largest)	Colour Score (1,3,5) (5=darkest)	% Root cover over pot-ball	% Plants dead
1	**PB**	**Nil**	4.47	2.80	4.80	5.00	71.0	0
2	**PB**	**1.0**	2.40	2.27	2.77	4.40	41.3	40
3	**PB**	**1.25**	2.80	1.93	1.65	3.27	14.3	13
4	**PB**	**1.5**	2.73	2.13	2.19	4.11	19.6	27
5	**Coir**	**Nil**	3.33	2.53	4.07	4.87	49.3	0
6	**Coir**	**1.0**	2.20	2.07	2.93	4.73	14.0	0
7	**Coir**	**1.25**	1.43	1.52	1.58	2.73	8.3	20
8	**Coir**	**1.5**	2.00	1.67	1.60	2.60	2.3	0
9	**Peat**	**Nil**	4.33	2.67	4.47	5.00	60.0	0
10	**Peat**	**1.0**	3.20	2.33	3.40	4.67	39.7	27
11	**Peat**	**1.25**	1.20	1.07	1.33	2.33	4.7	73
12	**Peat**	**1.5**	2.27	1.53	1.25	2.00	2.3	20
	d.f.=22	*SED = ±*	*0.328*	*0.300*	*0.420*	*0.578*	*9.04*	
		LSD (5%) = ±	*0.68*	*0.62*	*0.87*	*1.20*	*18.7*	

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 27 Year 2: *Potentilla* 'Tangerine' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1,3,5) (5=largest)	7.6.94 Size Score (1,3,5) (5=largest)	7.6.94 % Root cover over pot-ball	7.6.94 Total No. Vine Weevil Larvae (15 plants)
1	**PB**	**Nil**	3.13	3.87	74.3	12
2	**PB**	**1.0**	3.40	3.93	63.3	0
3	**PB**	**1.25**	3.13	3.40	62.0	0
4	**PB**	**1.5**	2.73	3.13	62.7	0
5	**Coir**	**Nil**	4.07	4.07	71.3	0
6	**Coir**	**1.0**	2.87	3.80	64.7	0
7	**Coir**	**1.25**	3.40	3.00	70.3	0
8	**Coir**	**1.5**	3.13	3.27	60.7	0
9	**Peat**	**Nil**	3.00	3.40	67.3	13
10	**Peat**	**1.0**	2.80	3.80	58.0	0
11	**Peat**	**1.25**	2.47	3.27	56.0	0
12	**Peat**	**1.5**	1.67	2.60	52.7	
d..f.=22	*SED = ±*		*0.599*	*0.612*	*5.09*	
	LSD(5%) = ±		*1.24*	*1.27*	*10.5*	

Key: **PB** : Cambark 100

APPENDIX III

Table 28 Year 2: *Chamaecyparis lawsoniana* 'Ellwood's Gold' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No.	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1,3,5) (5=largest)	7.6.94 Size Score (1,3,5) (5=largest)	7.6.94 % Root cover over pot-ball
1	**PB**	**Nil**	2.87	2.87	46.7
2	**PB**	**1.0**	2.73	2.60	46.0
3	**PB**	**1.25**	3.67	2.73	48.7
4	**PB**	**1.5**	2.87	3.00	46.0
5	**Coir**	**Nil**	4.20	3.27	59.3
6	**Coir**	**1.0**	4.47	3.80	61.3
7	**Coir**	**1.25**	3.00	3.00	56.7
8	**Coir**	**1.5**	3.53	3.13	55.3
9	**Peat**	**Nil**	3.80	2.47	46.7
10	**Peat**	**1.0**	2.47	2.47	48.0
11	**Peat**	**1.25**	2.87	2.47	46.7
12	**Peat**	**1.5**	3.67	3.27	52.7
	d.f.=22	*SED =*	*0.578*	*0.467*	*3.78*
		LSD (5%) =	*1.20*	*0.97*	*7.8*

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 29 — Year 2: *Arabis* - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No.	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1to5) (5=largest)	7.12.93 Colour Score (1to3) (3=purple)	28.3.94 Size Score (1to5) (5=largest)	28.3.94 Colour Score (1,3,5) (5=purple)	28.3.94 Flower Score (1,3,5) (5=most)	28.3.94 % Root cover over pot-ball
1	**PB**	**Nil**	3.47	2.07	3.07	2.33	3.00	15.7
2	**PB**	**1.0**	3.32	1.43	2.82	2.33	2.17	35.3
3	**PB**	**1.25**	3.00	1.58	3.27	1.83	3.43	38.2
4	**PB**	**1.5**	3.73	1.47	3.87	1.53	3.93	39.3
5	**Coir**	**Nil**	3.05	1.52	3.18	2.80	2.53	18.8
6	**Coir**	**1.0**	3.00	1.07	3.07	1.67	2.47	32.0
7	**Coir**	**1.25**	2.52	1.13	2.80	1.67	1.67	35.2
8	**Coir**	**1.5**	2.85	1.22	3.38	1.53	2.77	33.8
9	**Peat**	**Nil**	2.71	2.36	2.40	3.36	2.42	13.5
10	**Peat**	**1.0**	2.48	1.08	2.25	1.60	1.67	25.4
11	**Peat**	**1.25**	2.13	1.27	2.40	2.07	1.67	30.7
12	**Peat**	**1.5**	2.73	1.40	2.47	1.80	2.33	32.7
	d.f =22	*SED = ±*	*0.269*	*0.183*	*0.330*	*0.464*	*0.607*	*4.71*
		LSD (5%) = ±	*0.56*	*0.38*	*0.68*	*0.96*	*1.26*	*9.8*

Key: PB = Peat : Carr bark 100

APPENDIX III

Table 30 Year 2: Variegated *Aubretia* - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	7.12.93	21.4.94				
			Vigour Score (1to5) (5=greatest)	Size Score (1to5) (5=largest)	Flower Score (1,3,5) (1=none 5=most)	% Root cover over pot-ball	% Plants dead	Total No. Vine Weevil Larvae (15 plants)
1	**PB**	**Nil**	3.75	3.82	3.67	43.7	7	12
2	**PB**	**1.0**	3.00	3.27	3.53	43.3	0	3
3	**PB**	**1.25**	2.60	2.87	3.00	41.8	13	0
4	**PB**	**1.5**	2.87	3.27	3.60	50.3	7	0
5	**Coir**	**Nil**	3.40	3.24	2.69	31.7	13	16
6	**Coir**	**1.0**	3.36	3.77	3.64	32.4	7	4
7	**Coir**	**1.25**	2.61	3.87	3.76	35.1	27	1
8	**Coir**	**1.5**	3.18	3.80	3.84	45.6	13	0
9	**Peat**	**Nil**	2.16	1.64	2.83	26.7	13	5
10	**Peat**	**1.0**	2.26	2.90	2.84	43.4	7	0
11	**Peat**	**1.25**	2.20	3.07	3.53	34.7	0	0
12	**Peat**	**1.5**	2.68	2.80	3.17	36.2	13	0
	d.f.=20	*SED = ±*	*0.395*	*0.428*	*0.521*	*8.61*		
		LSD (5%) = ±	*0.82*	*0.89*	*1.1*	*17.8*		

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 31

Year 2: *Dianthus* 'Waithman Jubilee' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1,3,5) (5=largest)	6.6.94 Size Score (1,3,5) (5=largest)	6.6.94 Flower Score (1,3,5) (5=most)	6.6.94 % Root cover over pot-ball
1	**PB**	**Nil**	5.00	5.00	4.60	85.3
2	**PB**	**1.0**	4.20	4.47	3.80	72.7
3	**PB**	**1.25**	4.20	5.00	4.07	74.7
4	**PB**	**1.5**	3.80	3.67	3.67	66.0
5	**Coir**	**Nil**	1.93	3.27	3.53	91.3
6	**Coir**	**1.0**	1.27	2.47	3.00	67.3
7	**Coir**	**1.25**	1.53	3.00	3.13	66.0
8	**Coir**	**1.5**	1.80	2.47	2.87	64.7
9	**Peat**	**Nil**	4.33	4.60	3.13	77.3
10	**Peat**	**1.0**	3.40	4.06	3.67	70.7
11	**Peat**	**1.25**	3.13	3.40	3.13	62.7
12	**Peat**	**1.5**	2.60	2.60	2.87	48.7
	d.f.=22	*SED = ±*	*0.434*	*0.440*	*0.429*	*7.16*
		LSD (5%) = ±	*0.90*	*0.91*	*0.89*	*14.8*

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 32

Year 2: *Phlox subulata* 'Red Wing' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No.	Media	suSCon Green (kg/m^3)	28.10.93			21.4.94				
			Size Score (1to5) (5=largest)	Bronzing Score (1to3) (3=most bronze)	Chlorosis Score (1to3) (3=most)	Size Score (1to5) (5=largest)	Colour Score (1,3,5) (5=darkest 1=yellow+ diesback)	Flower Score (1,3,5) (1=none 5=most)	% Root cover over pot-ball	% Plants dead
1	**PB**	**Nil**	2.67	1.00	1.60	3.07	4.60	4.07	64.7	0
2	**PB**	**1.0**	2.87	1.62	1.93	2.80	3.77	3.03	45.2	7
3	**PB**	**1.25**	3.65	1.70	1.43	3.70	3.53	2.87	57.7	7
4	**PB**	**1.5**	2.87	1.47	1.47	2.78	3.03	2.20	35.7	7
5	**Coir**	**Nil**	3.13	1.20	1.33	3.60	4.20	3.13	62.3	0
6	**Coir**	**1.0**	2.17	1.00	2.05	1.60	2.73	1.80	44.0	0
7	**Coir**	**1.25**	1.75	1.13	2.47	2.05	3.90	2.93	38.7	7
8	**Coir**	**1.5**	1.80	1.13	2.36	1.93	3.00	2.47	44.7	0
9	**Peat**	**Nil**	3.42	1.50	1.30	3.57	3.63	3.07	62.7	7
10	**Peat**	**1.0**	2.82	1.73	1.68	2.93	3.30	2.23	44.0	7
11	**Peat**	**1.25**	2.73	1.13	1.80	2.85	3.73	2.87	44.9	7
12	**Peat**	**1.5**	2.47	1.40	2.07	2.33	3.40	2.13	32.2	7
	d.f.=22	*SED = ±*	*0.458*	*0.195*	*0.284*	*0.468*	*0.686*		*0.657*	*8.89*
		LSD (5%) = ±	*0.95*	*0.41*	*0.59*	*0.97*	*1.42*		*1.36*	*18.4*

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 33 Year 2: Mossy Saxifrage 'Stansfeldii' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	7.12.93 Size Score (1to5) (5=largest)	7.12.93 Chlorosis Score (1to3) (3=yellow/red)	7.12.93 % Plants dead	10.2.94 Size Score (1to5) (5=largest)	10.2.94 % Root cover over pot-ball	10.2.94 % Plants with 50% root cover over pot-ball	10.2.94 Plant deterioration score (5=dead)	10.2.94 % Plants dead	10.2.94 Mean No. Vine Weevil Larvae/pot
	PB	**Nil**	3.99	2.16	20	2.67	5.3	7	4.20	67	9.0
2	**PB**	**1.0**	3.27	1.65	7	3.00	10.6	13	2.73	27	6.7
3	**PB**	**1.25**	2.47	1.73	0	2.60	12.5	7	2.53	33	3.4
4	**PB**	**1.5**	2.80	2.00	0	2.87	7.6	0	2.93	40	3.3
5	**Coir**	**Nil**	2.91	2.07	47	1.87	1.1	0	4.47	80	3.7
6	**Coir**	**1.0**	3.43	1.13	7	3.80	64.7	80	0.67	7	1.3
7	**Coir**	**1.25**	3.33	1.13	0	4.07	77.3	100	0.07	0	0.7
8	**Coir**	**1.5**	3.53	1.20	0	4.40	74.7	93	0.20	0	1.3
9	**Peat**	**Nil**	2.09	2.83	93	1.00	0.2	0	5.00	100	6.5
10	**Peat**	**1.0**	2.13	1.73	0	2.73	14.5	7	1.87	27	4.5
11	**Peat**	**1.25**	2.43	2.23	7	2.73	6.5	0	2.93	40	4.6
12	**Peat**	**1.5**	2.47	1.60	0	2.87	6.3	0	2.07	20	4.1
d.f.=22	*SED = ±*		*0.479*	*0.309*		*0.565*	*6.78*		*0.755*		*1.26*
	LSD(5%) = ±		*0.99*	*0.640*		*1.17*	*14.0*		*1.56*		*2.61*

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 34 Year 2: *Sedum* 'Autumn Joy' - Growth Records

(figures are a mean of 3 replicates, 5 plants/plot)

Treatment No	Media	suSCon Green (kg/m^3)	12.10.93 Size Score (1to5) (5=largest)	Colour Score (1to3) (3=darkest)	Flower Stage Score (1=opening 3=open 5=open)	% Plants with damaged stems	26.11.93 % Root cover over pot-ball	Log of No. Vine Weevil Larvae/pot	(Actual No. Vine Weevil Larvae/pot)
1	**PB**	**Nil**	3.40	3.13	3.8	60	16.4	3.97	(56.8)
2	**PB**	**1.0**	3.67	3.27	3.5	53	18.7	1.48	(5.5)
3	**PB**	**1.25**	3.93	3.13	3.8	87	12.7	1.25	(3.7)
4	**PB**	**1.5**	3.87	3.13	3.7	53	12.3	0.93	(2.5)
5	**Coir**	**Nil**	2.87	2.87	4.5	60	13.8	3.63	(37.8)
6	**Coir**	**1.0**	3.00	3.27	2.9	13	15.3	2.05	(8.4)
7	**Coir**	**1.25**	2.73	2.73	3.9	0	9.7	1.28	(3.6)
8	**Coir**	**1.5**	3.00	3.13	3.1	20	7.0	1.96	(8.3)
9	**Peat**	**Nil**	3.67	1.93	3.4	33	8.7	3.51	(33.4)
10	**Peat**	**1.0**	3.80	3.00	3.4	0	16.3	1.77	(6.5)
11	**Peat**	**1.25**	3.67	3.67	3.5	0	8.5	1.29	(3.7)
12	**Peat**	**1.5**	3.62	2.80	3.6	1	9.1	1.26	(3.5)
d.f =22		*SED = ±*	*0.380*	*0.583*	*0.66*		*3.38*	*0.343*	
		LSF(5%) = ±	*0.79*	*1.21*	*1.4*		*7.0*	*0.71*	

Key: **PB** = Peat : Cambark 100

APPENDIX III

Table 35 Year 2: *Rhododendron* 'Ginny Gee' – Observation in PEAT Mix

(unreplicated observation, figures are a mean of 5 plants)

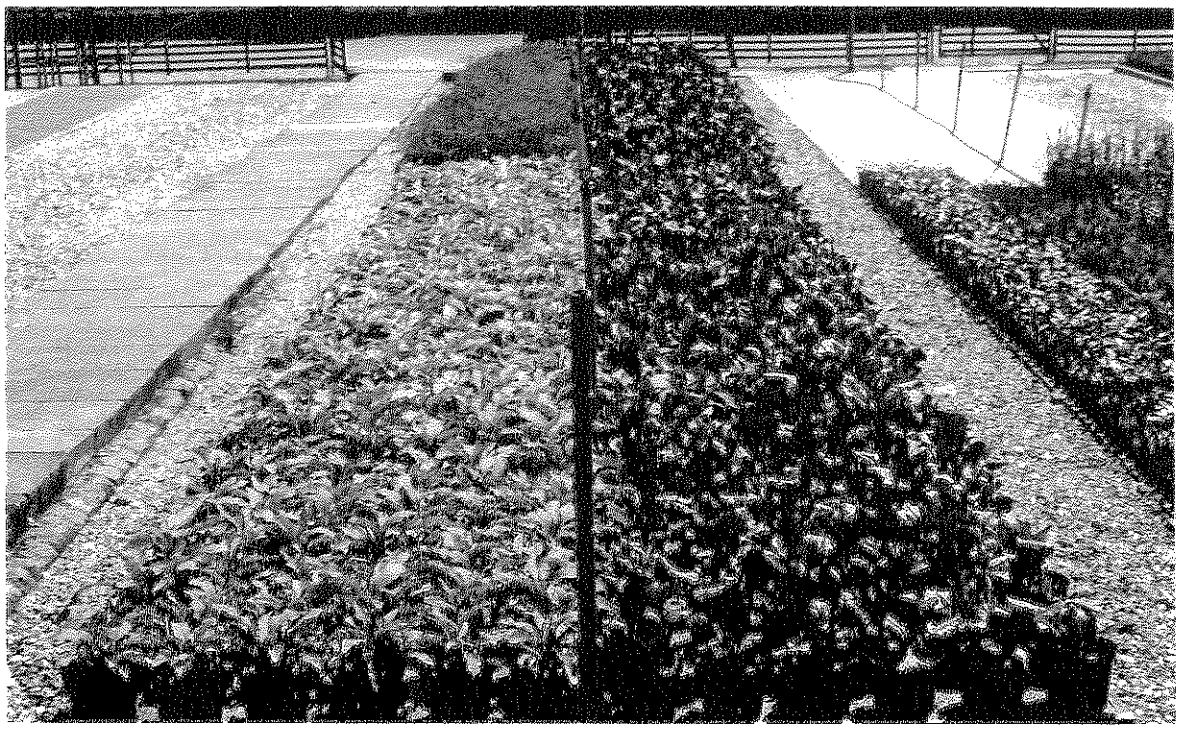
Treatment No.	suSCon Green (kg/m^3)	Size Score 1-5 (5=largest)	%Root cover over pot-ball	Weevil Tracking* 0-4 (4=most)	Leaf Notching 0-2 (2=most)	% Plants with halo ** effect
9	**Nil**	2.78	66.7	1.44	0.56	0
10	**1.0**	3.77	73.5	0.0	0.62	100
11	**1.25**	3.40	73.3	0.0	0.93	100
12	**1.5**	3.00	72.5	0.0	0.79	100

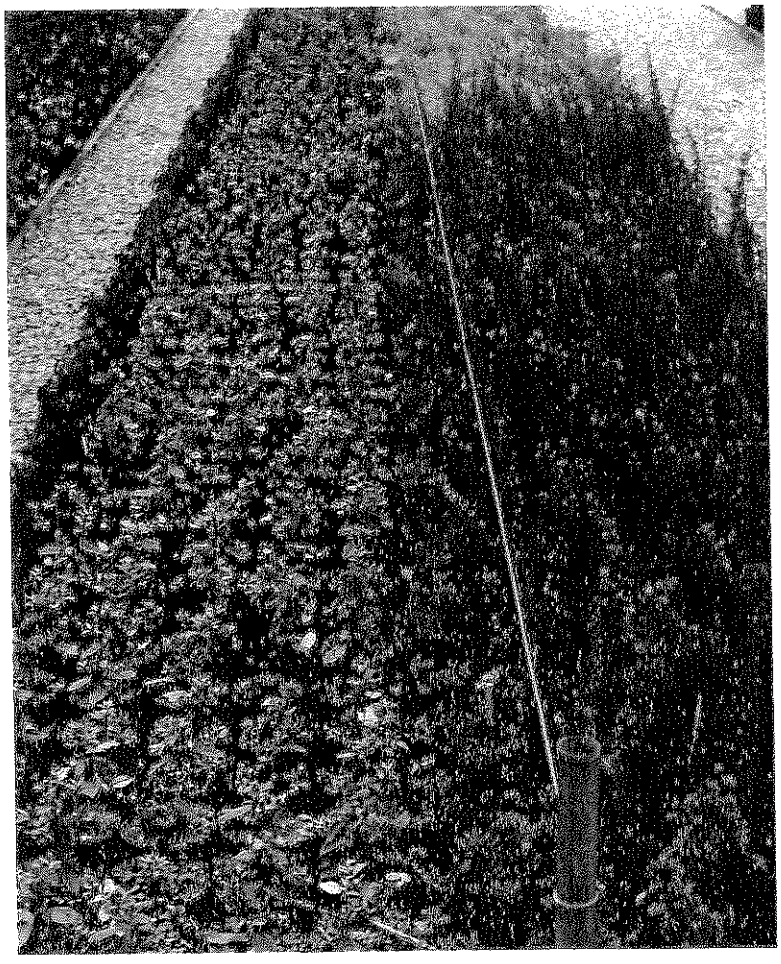
* **"Tracking"** = Amount of larvae tracks observed across surface of pot-ball (see Plate 10).

** = **"Halo" effect** Zone around suSCon Green granule without roots (appears to be avoidance rather than damage, (see Plate 10).

APPENDIX IV Plate 1

General View of Trials (Year 1)



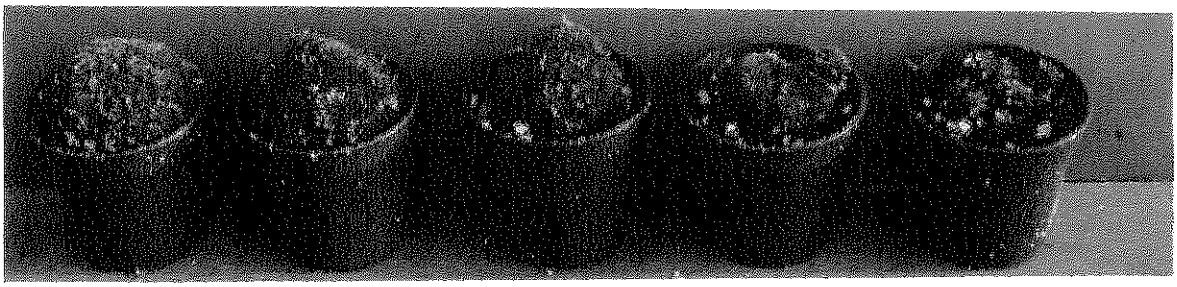


Herbaceous species
(photographed June 1992)

HNS species
(photographed April 1993)

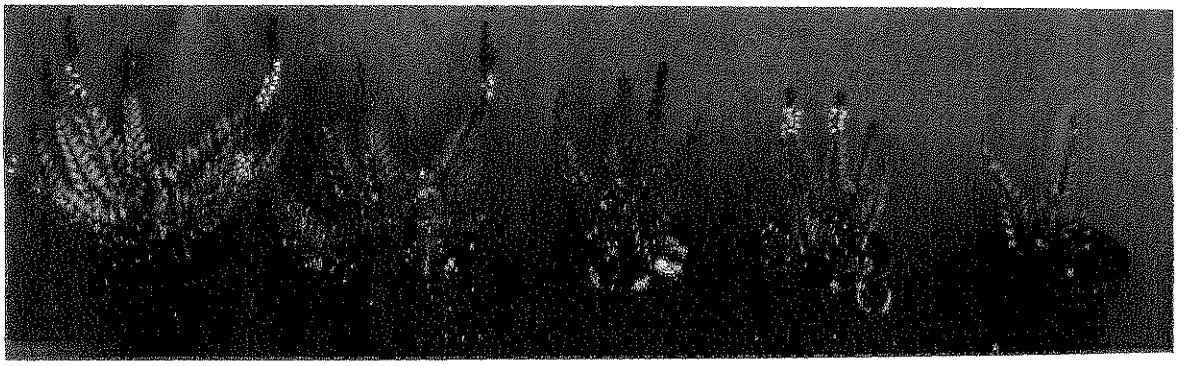
Illustration of Size Grades used for sowing

5 4 3 2 1



Mossy Saxifrage 'Stansfeldii'

Astilbe 'Joe Ophurst'



Calluna vulgaris 'Firefly'

Viburnum tinus

APPENDIX IV Plate 3 *Viburnum tinus*

Influence of Growing Media x Rate of suSCon Green

(photographed 26 October 1993)

100% Peat

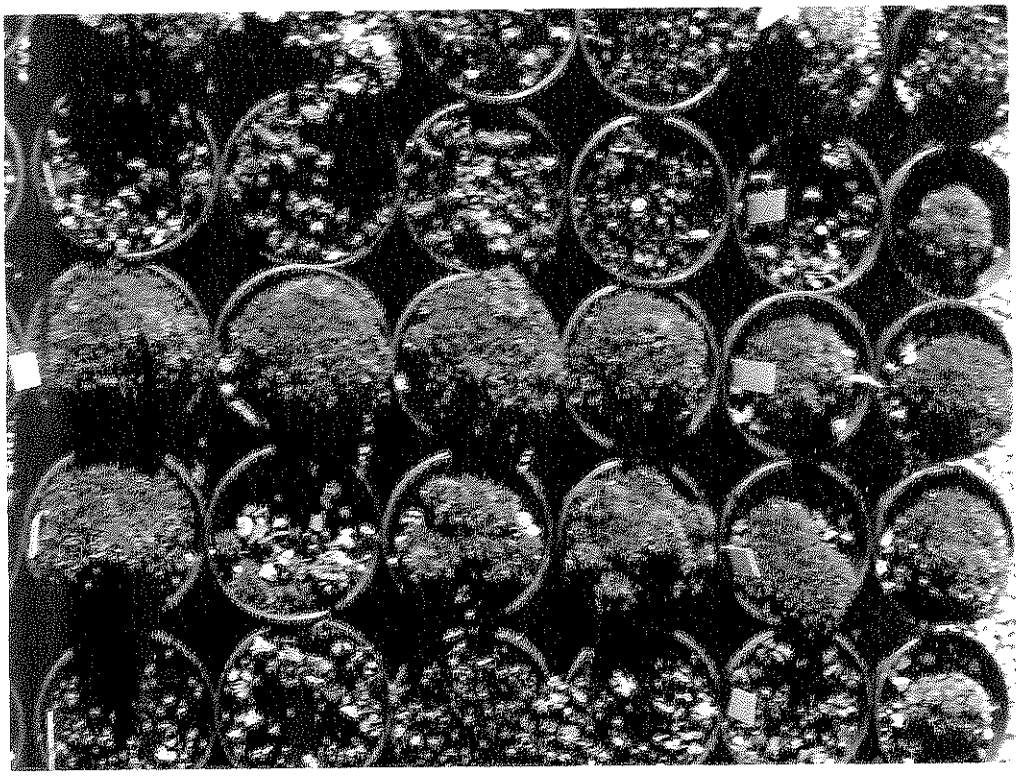
Rate suSCon Green – kg/m^3

Nil **1.0** **1.25** **1.5**

75% Peat : 25% Granulated Pine Bark

(photographed 10 March 1994)

Unprotected pots are killed out by vine weevil infestation



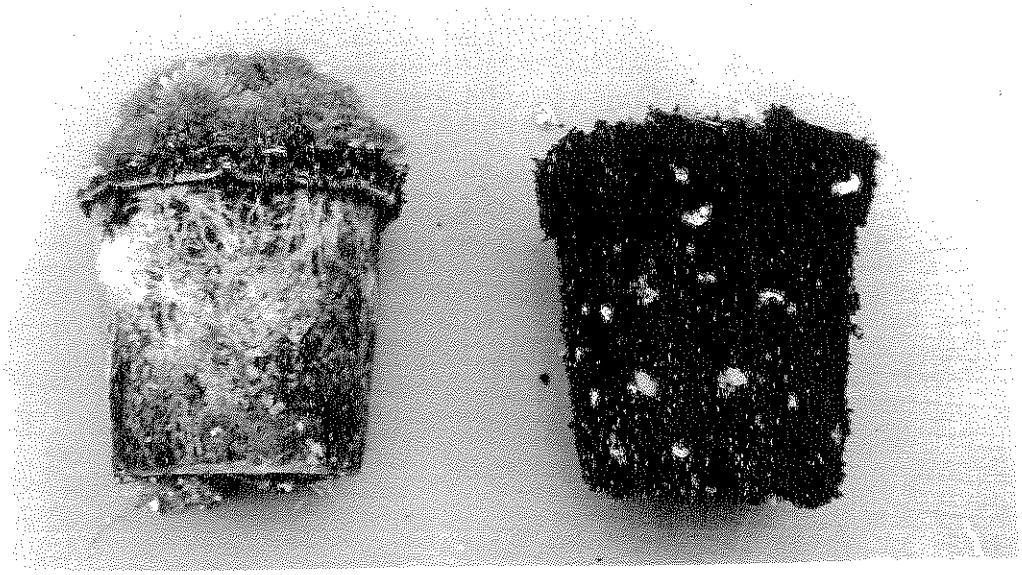
Untreated (Peat)

1.5 kg/m^3 suSCon (Coir)

1.0 kg/m^3 suSCon G (Coir)

Untreated (Coir)

100% Coir

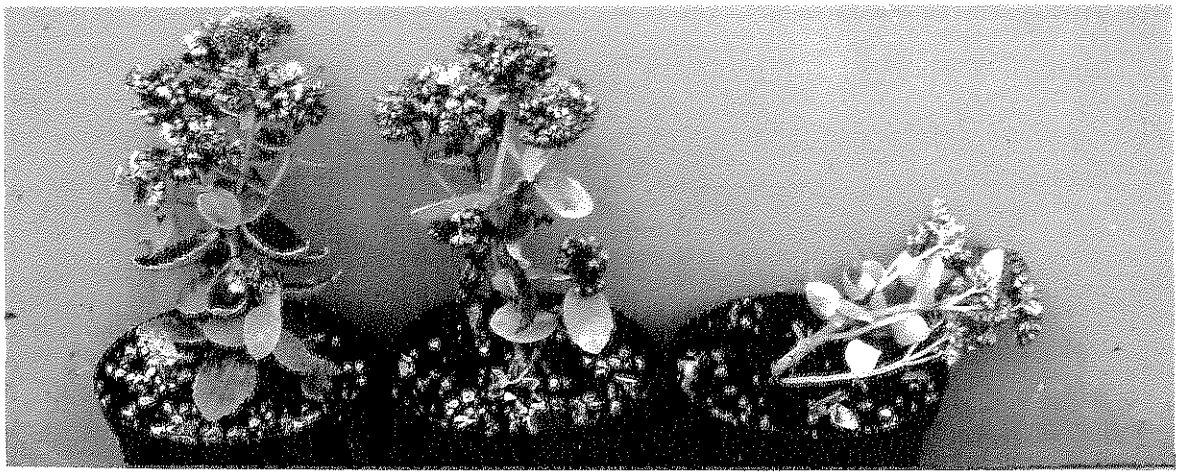


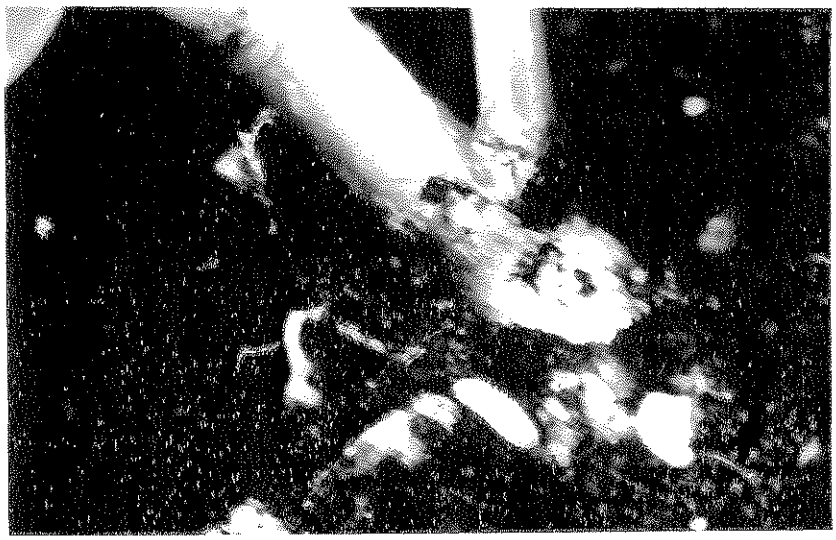
1.5 kg/m^3
suSCon Green

untreated

General view – plants unstable, snapping at neck

Progressive damage observed





Vine weevil larvae damage. Base of stem completely girdled

APPENDIX IV Plate 6

Effects of increasing rates of suSCon Green on herbaceous species in peat mix

(photographed 17 June 1993)

Hosta 'Honey Bells'

Rate suSCon Green kg/m^3

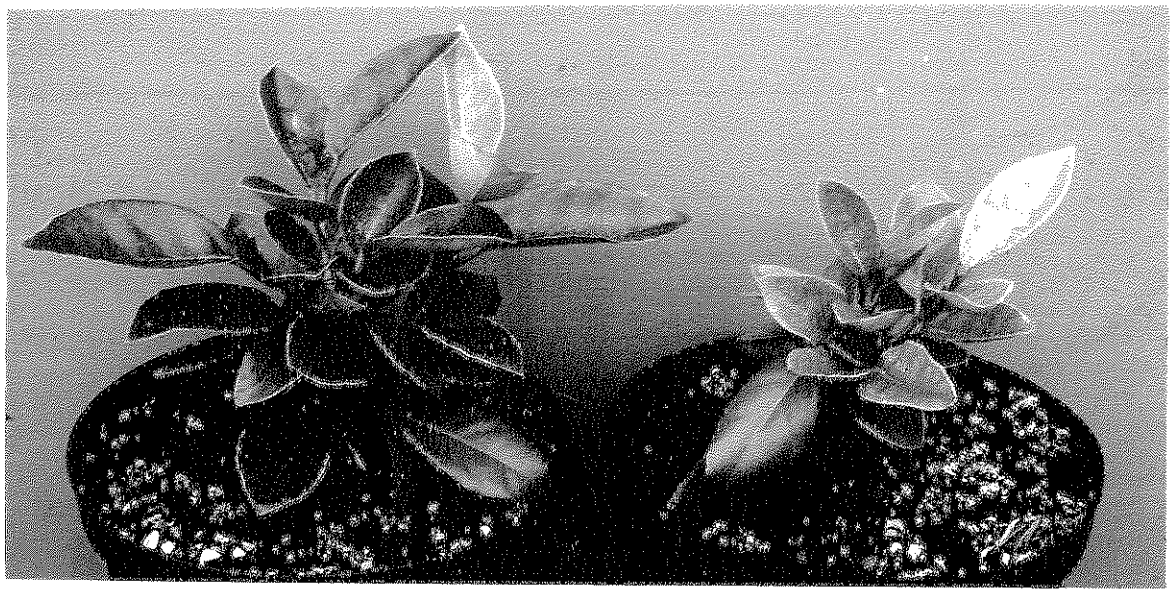
Nil 1.0 1.25 1.5

Bergenia 'Sunningdale'

Phytotoxicity symptoms observed

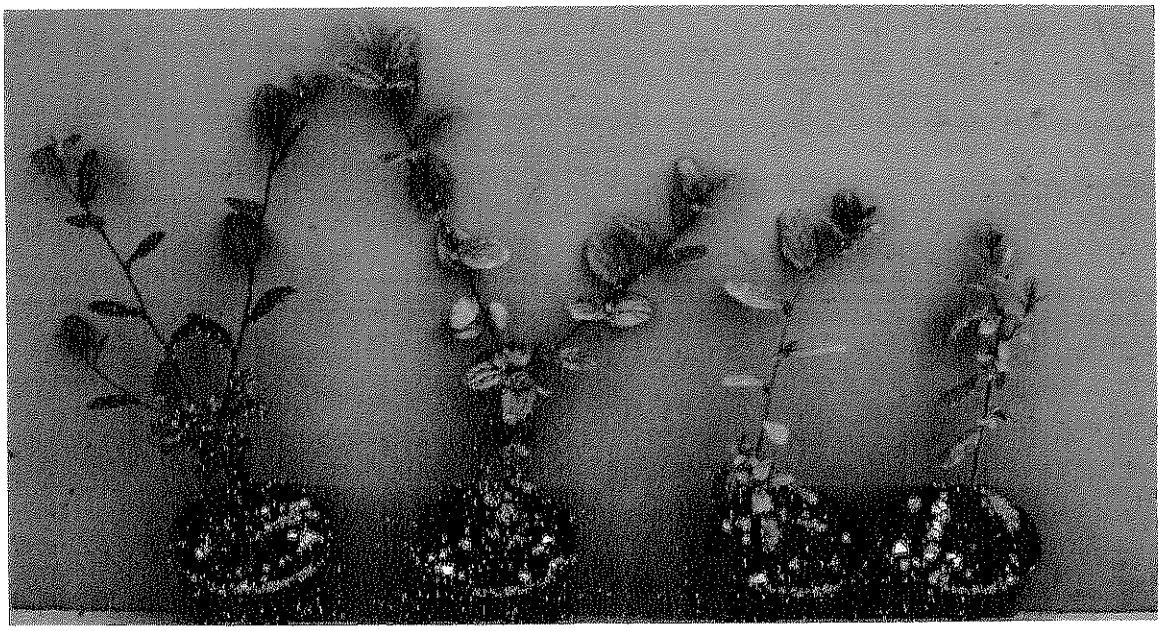
(photographed 1 October 1993)

Elaeagnus ebbingei



Foliage chlorosis observed on some plants at 1.5 kg/m^3 suSCon Green in peat mix

Ceanothus **'Autumnal Blue' : Phytotoxicity scores used**



0 **1** **2** **3**

APPENDIX IV Plate 8

Root Damage observed in peat mix

(photographed 5 July 1994)

Azalea 'Blue Danube'

Rate suSCon Green kg/m^3

Nil 1.0 1.25 1.5

Erica carnea

Effects of increasing rates of suSCon Green on top and root growth

(photographed 5 July 1994)

100% Peat

Rate suSCon Green kg/m^3

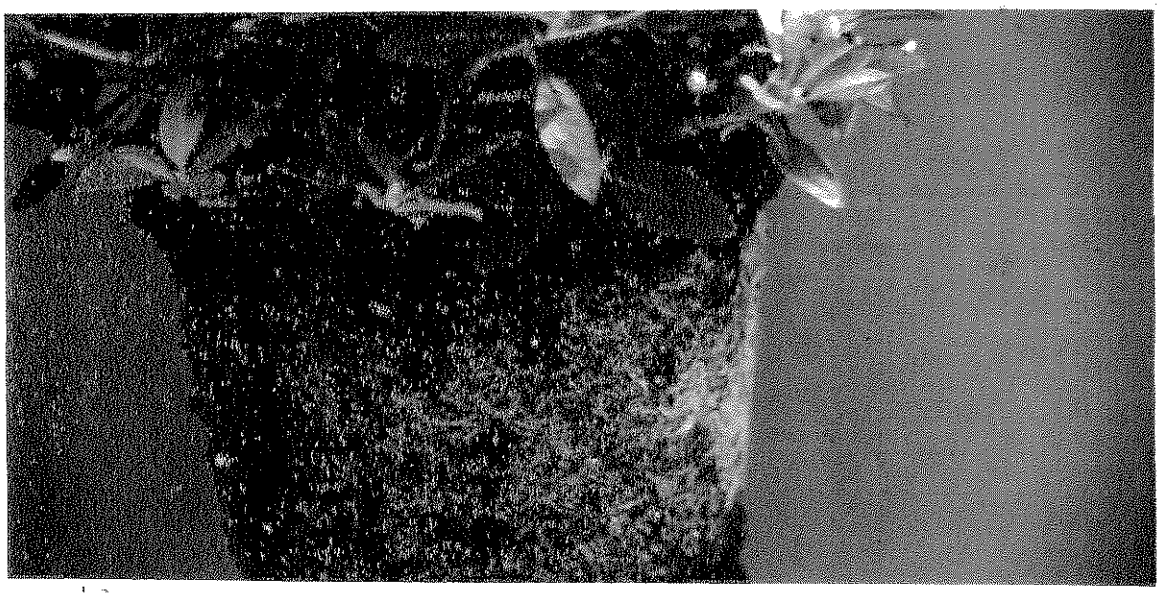
Nil **1.0** **1.25** **1.5**

APPENDIX IV Plate 10 *Rhododendron* 'Ginny Gee'

(photographed September 1994)

Vine Weevil larvae 'Tracking' over surface of root-ball

'Halo' effect around suSCon Green granules in peat growing media



APPENDIX V HRI EFFORD METEOROLOGICAL DATA

TABLE 36 RAINFALL (mm)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1994	**132.2**	**89.4**	**57.8**	**61.3**	**81.7**	**23.4**	**19.6**					
1993	**98.0**	**6.2**	**45.2**	**74.7**	**45.7**	**61.6**	**86.2**	**35.8**	**120.7**	**169.3**	**64.4**	**185.0**
1992	21.7	28.6	51.6	**70.4**	**19.6**	**32.2**	**63.1**	**88.1**	**78.9**	**81.5**	**145.3**	**81.2**
1991	88.5	29.3	77.9	42.3	4.0	113.0	63.3	12.3	48.6	63.0	49.2	33.4
1990	112.7	166.5	6.4	43.9	11.2	55.3	12.2	23.1	28.9	98.6	53.6	62.3
1989	30.6	69.8	74.8	71.7	13.7	34.6	22.5	23.6	37.3	91.0	56.6	242.4
1988	170.9	47.3	82.0	39.5	27.9	34.3	71.8	63.6	41.6	98.4	20.7	20.8
1987	15.8	60.4	89.4	69.1	19.3	54.4	61.4	16.4	37.7	195.6	78.3	43.2
1986	109.9	11.3	61.3	58.9	74.3	25.3	46.6	87.6	33.9	79.2	114.6	102.6
1985	69.5	47.0	51.6	43.8	44.6	61.1	37.8	88.2	24.3	32.4	53.4	88.0
1984	120.5	36.1	81.3	0.3	86.4	18.6	12.0	18.7	62.1	94.6	127.9	96.2
1983	68.1	25.9	36.9	86.0	77.3	47.8	7.1	32.7	66.3	57.2	40.9	82.0
1982	45.6	47.1	88.4	21.4	44.6	87.6	38.2	56.4	60.5	195.0	111.2	85.3
11/12 yr mean	83.4	51.2	64.8	52.5	42.4	52.3	43.5	45.5	53.4	104.7	76.3	93.5
39 yr mean	82.1	54.9	59.8	44.6	47.9	54.9	47.6	57.9	70.0	82.8	83.0	87.6

NB: Bold figures in body of table relate to the period of the trial.

APPENDIX V HRI EFFORD METEOROLOGICAL DATA

Table 37 MEAN DAILY SUNSHINE HOURS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1994	**2.5**	**2.7**	**3.7**	**6.3**	**5.8**	**9.5**	**9.0**					
1993	**1.1**	**2.3**	**4.6**	**4.5**	**6.7**	**8.3**	**6.0**	**8.2**	**4.6**	**4.3**	**2.8**	**1.9**
1992	2.4	2.1	2.0	**5.5**	**9.3**	**8.3**	**5.4**	**5.2**	**4.7**	**4.2**	**2.0**	**1.7**
1991	2.2	2.8	3.6	5.8	5.8	5.2	7.2	8.6	6.1	3.0	2.2	1.7
1990	1.5	3.2	5.2	8.1	9.6	4.6	10.2	8.6	6.3	3.5	3.0	2.0
1989	2.2	3.7	3.0	5.7	10.6	9.3	9.8	9.3	4.8	3.6	3.6	1.1
1988	2.0	4.6	3.4	6.5	8.0	6.1	6.7	5.9	3.8	3.5	3.5	1.5
1987	2.1	3.0	3.9	6.7	7.8	5.8	7.2	6.5	5.0	3.5	2.1	1.4
1986	2.0	2.7	3.6	5.6	5.9	7.2	6.2	5.7	5.6	3.4	2.8	2.1
1985	2.5	3.0	4.3	5.7	6.9	6.0	7.9	6.5	5.4	4.1	2.8	1.2
1984	2.8	2.9	2.9	8.2	4.9	9.9	8.9	6.8	4.0	2.9	2.2	1.9
1983	1.9	3.7	3.6	5.4	5.6	6.6	9.2	8.5	3.9	3.7	1.9	2.1
1982	1.9	1.8	5.2	6.7	7.3	7.1	6.6	5.8	5.2	3.0	2.4	1.7
11/12 mean	2.1	2.9	3.8	6.2	7.2	7.1	7.6	7.1	5.0	3.5	2.6	1.7
39 yr mean	2.0	2.8	4.1	6.0	7.2	7.3	7.3	6.8	5.4	3.8	2.6	1.7

NB. Bold figures in body of table relate to the period of the trial.

APPENDIX V HRI EFFORD METEOROLOGICAL DATA

Table 38 MEAN DAILY MAXIMUM TEMPERATURE (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1994	**9.5**	**8.2**	**11.5**	**12.2**	**14.8**	**18.7**	**22.2**					
1993	**9.8**	**7.8**	**10.4**	**13.2**	**16.5**	**19.5**	**19.1**	**19.6**	**17.1**	**13.0**	**9.4**	**9.7**
1992	7.2	9.0	10.9	**12.7**	**18.7**	**20.6**	**20.1**	**19.5**	**17.6**	**12.9**	**12.3**	**8.2**
1991	7.3	5.1	11.0	12.2	15.5	15.5	20.5	21.0	20.0	14.0	10.9	8.5
1990	10.4	11.2	11.8	13.6	18.4	16.9	21.9	22.7	19.1	16.1	10.8	7.9
1989	9.9	10.0	11.5	10.8	19.3	20.2	23.9	21.6	19.5	16.5	11.5	9.5
1988	9.1	8.9	10.2	12.7	16.7	18.8	17.5	19.1	17.7	15.1	10.6	10.7
1987	3.9	7.4	8.1	13.4	15.2	16.6	20.5	20.4	18.1	14.7	10.5	8.3
1986	7.8	2.2	8.3	9.9	13.7	20.0	19.4	17.9	15.9	15.4	12.3	10.0
1985	4.2	5.8	8.4	12.7	15.8	17.2	20.5	18.1	18.4	14.9	8.3	9.8
1984	8.5	7.7	8.6	13.7	14.4	19.5	22.0	22.0	18.0	15.0	12.1	9.8
1983	9.6	5.4	9.6	10.8	13.8	18.3	24.4	22.7	17.8	14.5	11.0	9.7
1982	7.1	8.0	10.0	13.5	15.9	19.0	21.2	19.6	18.8	14.0	11.7	6.6
11/12 yr mean	8.0	7.5	10.0	12.4	16.1	18.5	20.9	20.3	18.2	14.7	11.0	9.1
39 yr mean	7.4	7.2	9.8	11.8	15.6	18.4	20.4	20.3	18.3	15.0	10.9	8.6

NB. Bold figures in body of table relate to the period of the trial.

APPENDIX V

HRI EFFORD METEOROLOGICAL DATA

Table 39 MEAN DAILY MINIMUM TEMPERATURE (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1994	**4.1**	**2.1**	**5.6**	**4.4**	**8.6**	**10.4**	**13.8**					
1993	**5.1**	**3.3**	**3.8**	**6.5**	**8.8**	**11.4**	**12.4**	**11.3**	**10.0**	**7.0**	**2.8**	**4.1**
1992	1.7	2.8	5.3	**5.6**	**9.2**	**10.8**	**13.5**	**13.4**	**12.0**	**5.4**	**6.2**	**2.7**
1991	3.1	0.5	5.4	4.8	7.0	9.4	12.9	12.8	11.5	8.1	4.8	4.0
1990	5.5	6.3	5.6	4.3	8.6	10.8	12.6	13.5	9.7	10.3	5.8	3.3
1989	4.3	3.3	5.1	3.9	9.4	10.9	14.3	13.0	12.0	10.0	5.6	4.3
1988	4.0	2.5	4.5	4.8	8.8	10.7	12.4	11.9	10.3	7.6	3.0	5.3
1987	0.6	1.7	1.9	6.1	7.0	9.7	12.4	11.9	11.9	8.4	4.8	4.5
1986	1.8	2.2	2.2	2.9	7.8	10.5	12.4	11.5	7.6	8.8	5.9	4.2
1985	1.3	0.2	1.5	4.5	7.3	9.2	11.9	12.5	11.1	8.7	2.2	5.5
1984	2.7	2.1	2.3	3.7	6.7	10.3	11.6	13.3	11.2	9.3	6.6	3.2
1983	5.1	0.6	3.4	4.2	7.7	11.3	14.9	13.1	11.4	8.4	5.9	3.8
1982	2.1	2.9	2.7	4.5	7.4	12.3	13.1	12.6	10.9	8.3	7.2	2.6
11/12 yr mean	3.2	2.4	3.8	4.7	8.0	10.6	12.9	12.6	10.8	8.4	5.1	3.9
39 yr mean	2.2	2.4	3.3	4.3	7.4	10.3	12.3	12.3	10.7	8.3	4.8	3.3

NB. Bold figures in body of table relate to the period of the trial.