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KEY POINTS FROM A TECHNICAL SESSION HELD AT CARTER HOLT HARVEY LTD, 321 GREAT SOUTH RD, GREEN LANE, AUCKLAND. JANUARY 30 1990.

Compiled by Jessica Hunter

Report No. 45 February 1990

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Ian Hunter

APPENDIX 3

Soil Phosphorus Testing
Malcolm Skinner

(The Phosphate Rock at pole stage stands session, was deferred until the next technical meeting)

11 January 1990

FRI/INDUSTRY RESEARCH COOPERATIVES

NATIONAL FOREST FERTILISING COOPERATIVE

Technical Committee Meeting, 9.00am, Tuesday, 30 January 1990
Carter Holt Harvey Forests Ltd, 321 Great South Road,
Greenlane, Auckland

BUSINESS SESSION

1.	Apologies	(P. Smale)
2.	Minutes of the last meeting, matters arising from the minutes	(P. Smale)
3.	CRAB update	(N. Williams)
4.	New Work Programme	(I. Hunter/M. Skinner)
	(i) International Collaboration	(I. Hunter)
	(ii) Date of next meeting	(P. Smale)

TECHNICAL SESSION

1.	Nutritional implications of cutover treatments	(Prof. Hamish Kimmins, University of British Columbia)
2.	Phosphate rock in pole stage stands	(I. Hunter)
3.	Graph vector analysis of foliar nutrients	(I. Hunter)
4.	Soil P testing	(M. Skinner)

APPENDIX 1

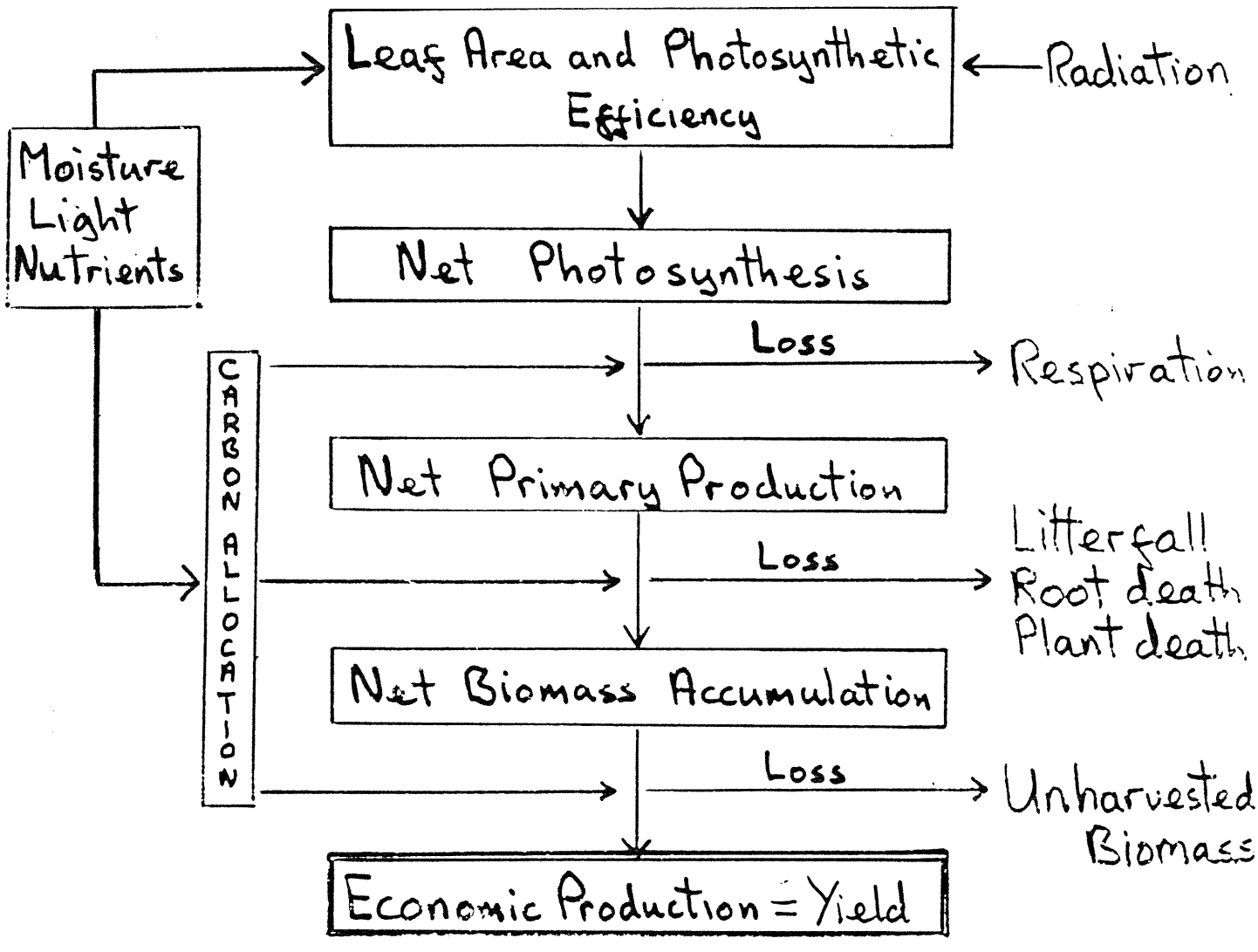
NUTRITIONAL IMPLICATIONS OF CUTOVER TREATMENTS

PROFESSOR HAMISH KIMMINS, UNIVERSITY OF BRITISH COLUMBIA

Long-term site "productivity" relates to:

- Resource availability
  - e.g. soil nutrients
- Successional processes
  - e.g. weed competition
- Climatic change and air pollution
  - e.g. greenhouse effect and "acid rain"
- Economics and politics
  - e.g. timber value and tax structure

Determinants of Net Biomass Accumulation and Economic Production



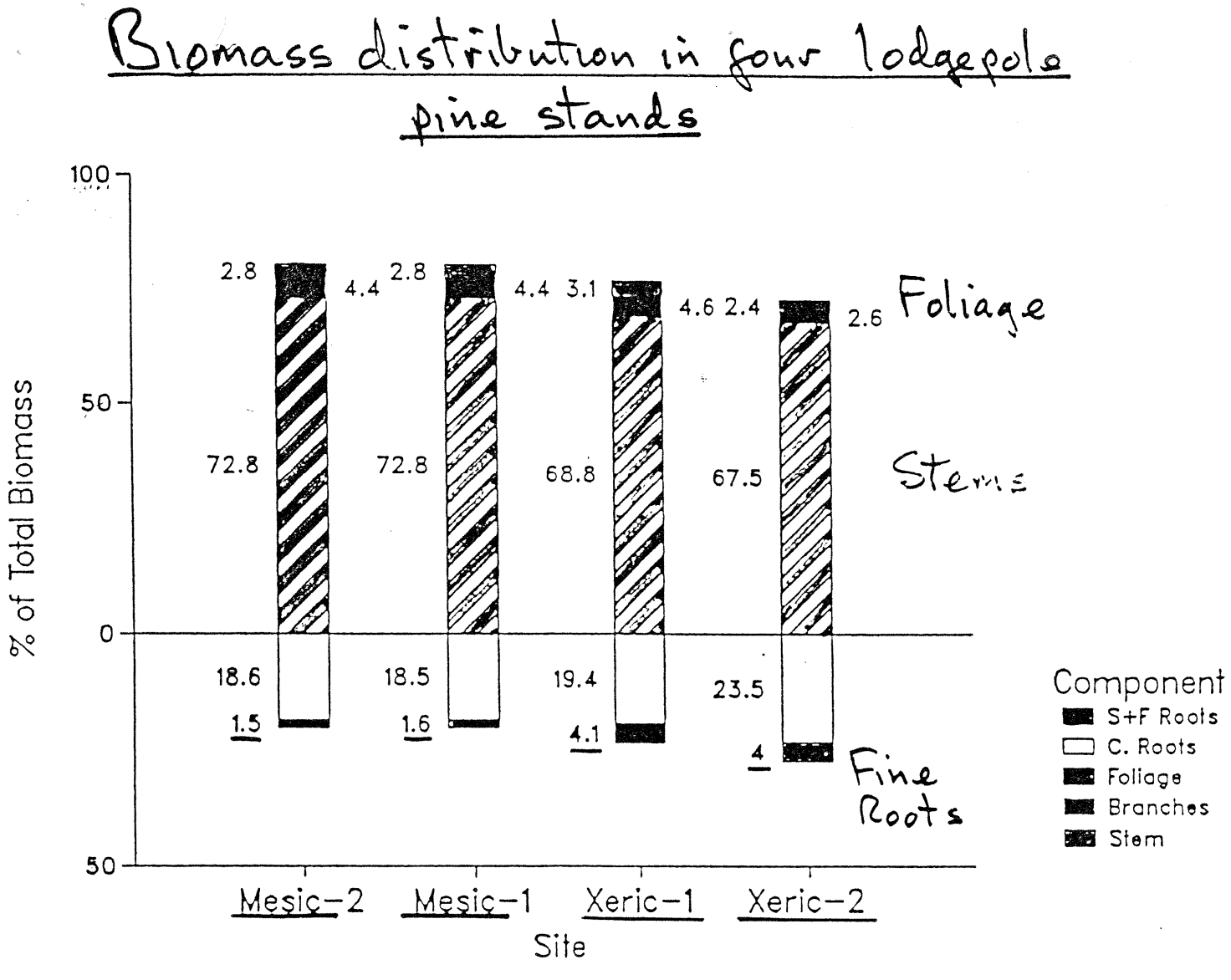


Figure 6.1. The distribution of tree biomass between aboveground and belowground components in four lodgepole pine ecosystems. (Values shown are % of total tree biomass.)

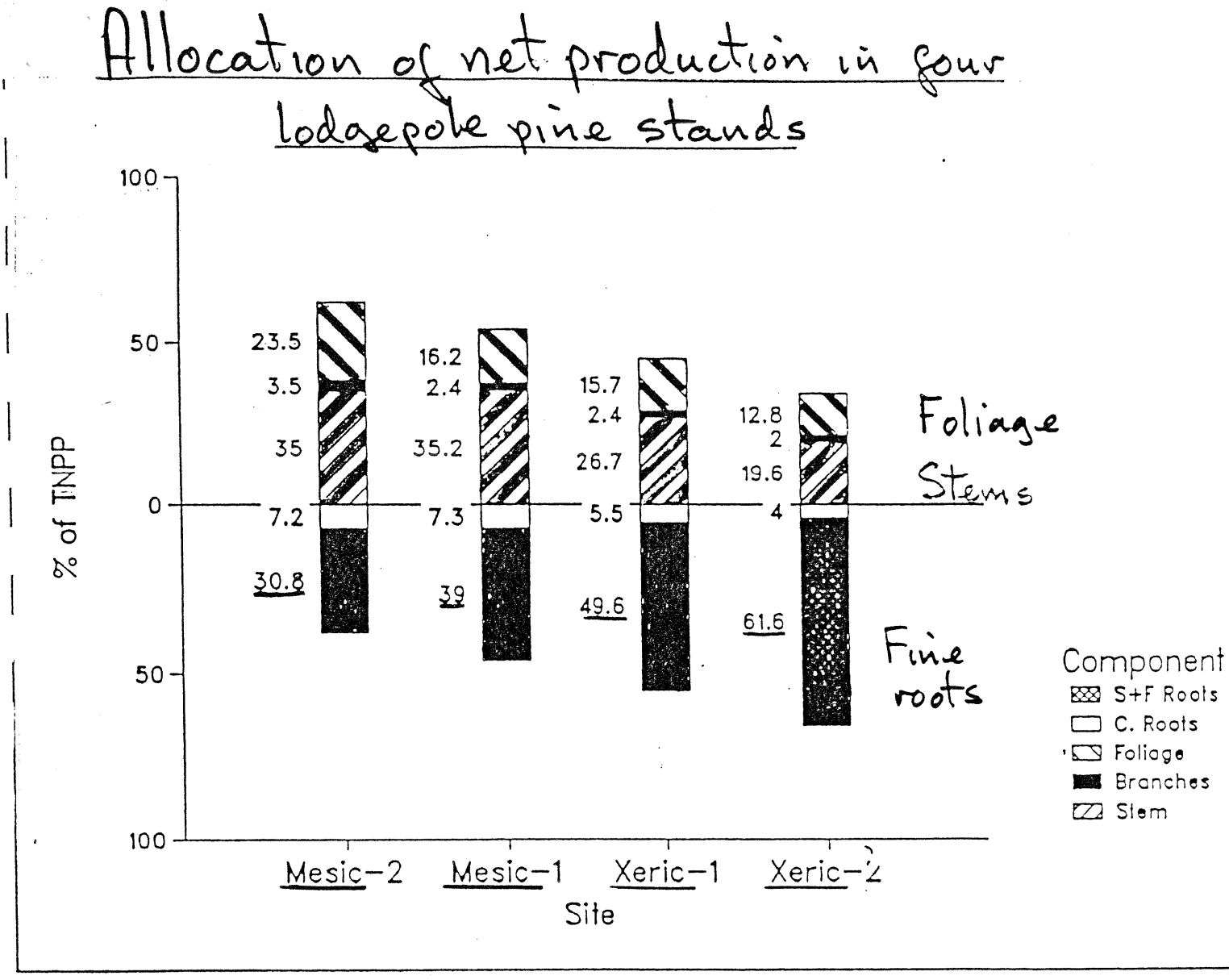
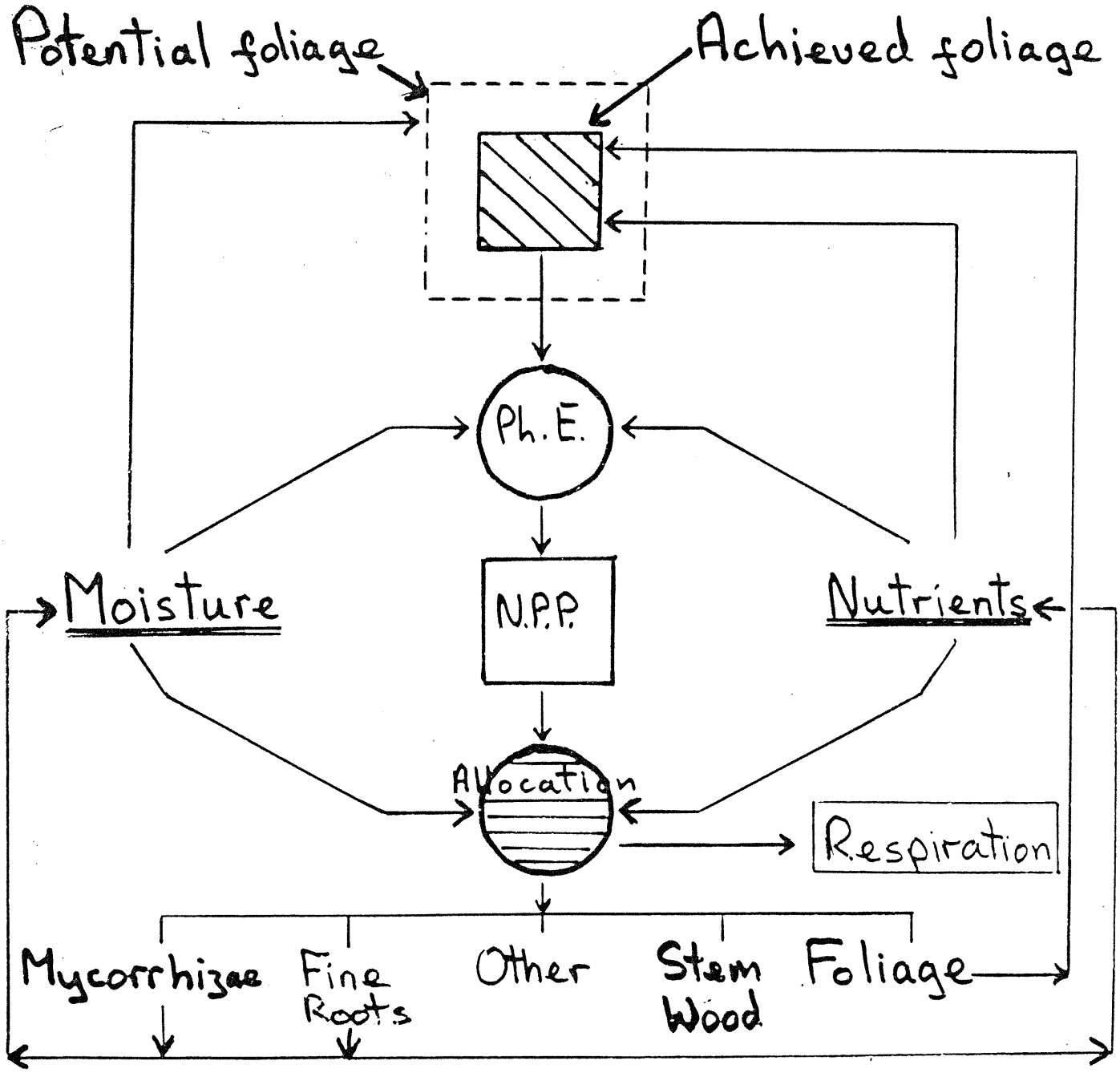
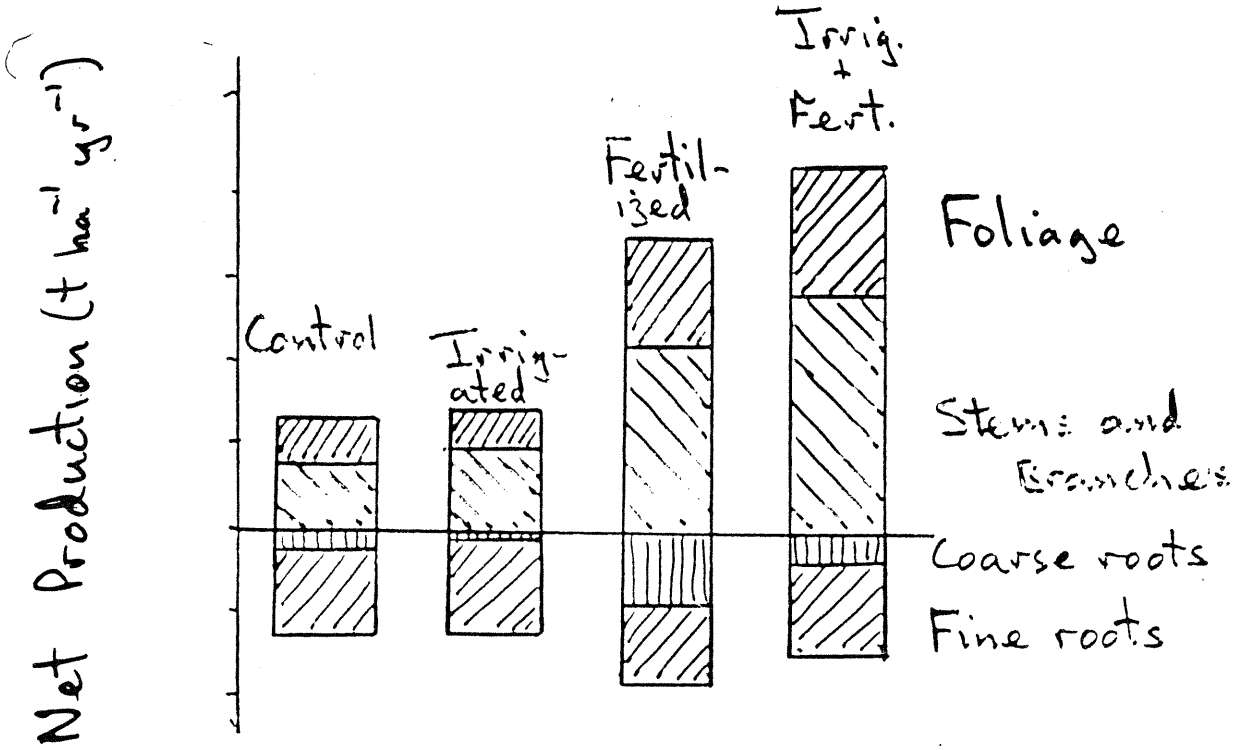


Figure 6.9. The distribution of total net primary production (TNPP) between aboveground and belowground components in each of the four stands sampled. (Values shown are % of total net primary production).

Effects of Moisture and Nutrients in Determining Forest Production and Yield

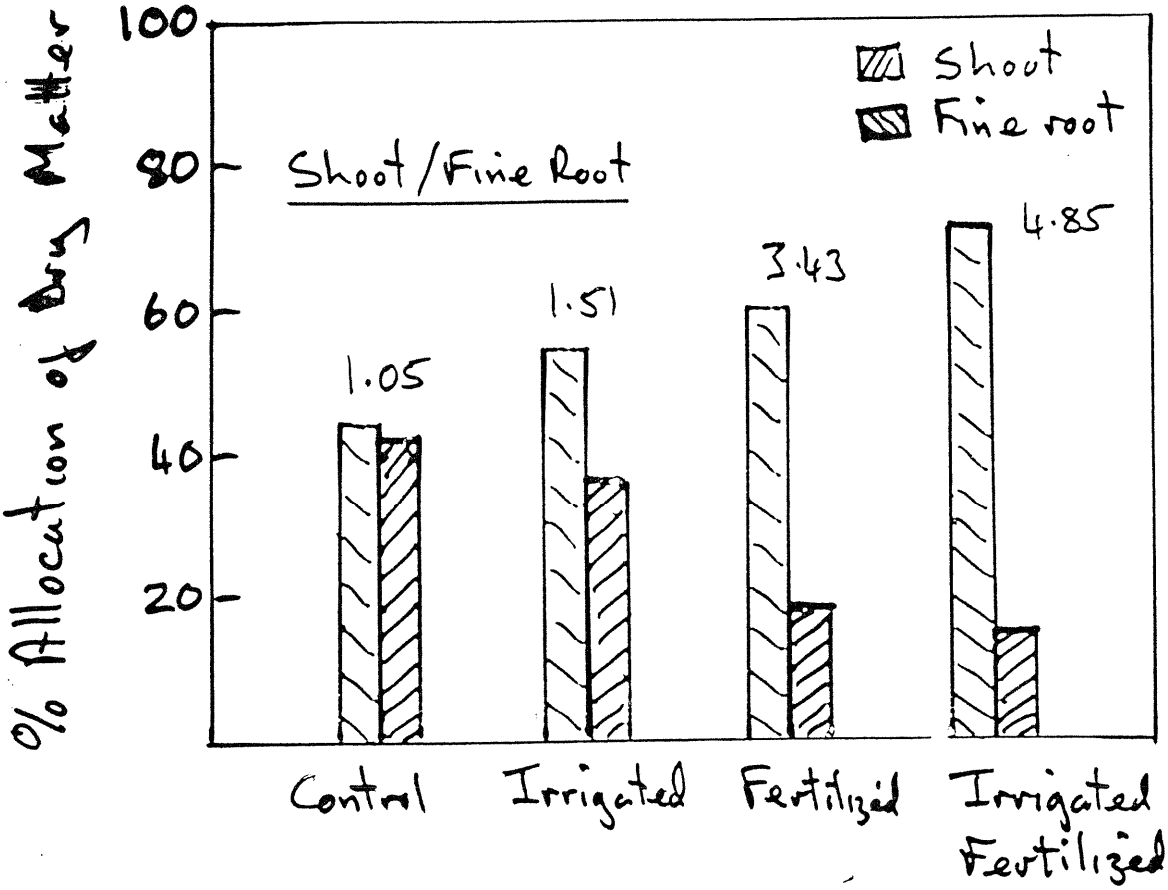


Effect of Moisture and Nutrients on Allocation to Fine Roots

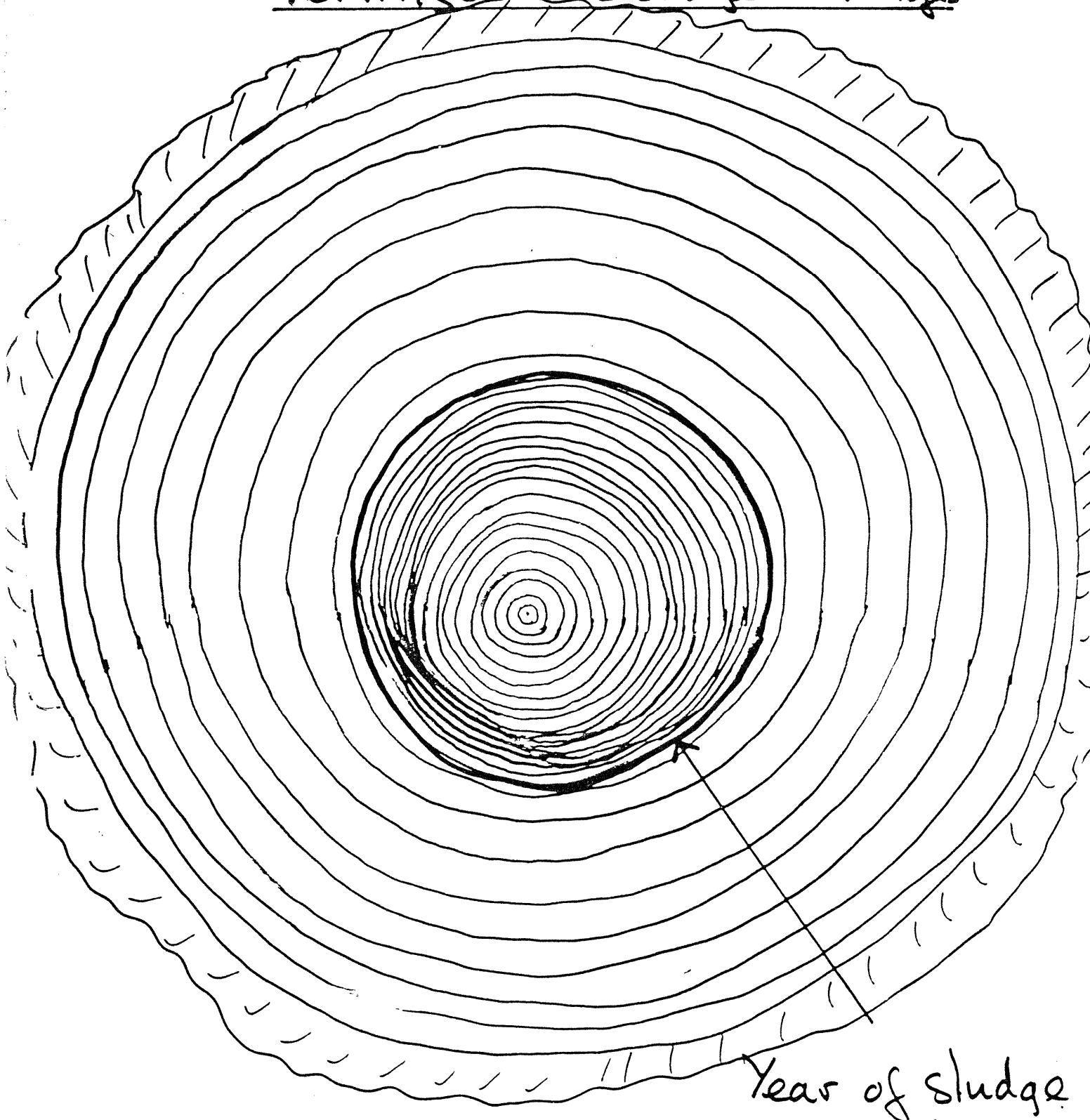


Axelsson 1983. Scots pine growing on sandy soil in SE Sweden

Relative Importance of Moisture and Nutrients in Determining Allocation to Fine Roots



Response of Douglas-fir to Organic Fertilizer – Sewage Sludge



Dry, ridge-top site !!?

APPENDIX 2

GRAPH VECTOR ANALYSIS OF FOLIAR NUTRIENTS

IAN HUNTER

VECTOR ANALYSIS OF FOLIAGE.

1. Normally the results of the chemical analysis of foliage are interpreted as shown in Figure 1.

2. But we know that fertiliser can increase needle weight, (of standard needles from the foliage-sampling position in the canopy) so part of the "signal" is thrown away.

3. A by-product of this study is the finding that there is a good

Table I Relationship between needle weight per 50 fascicles and stand thrift

Needle weight per 50 fascicles	Stand "thrift"
< 2.5 grammes	unthrifty
2.51 - 4.00 gr	average
> 4.01 grammes	vigorous

relationship between needle weight and subsequent volume increment (figure 2). It looks possible to use a classification like the one given in Table I. The degree of "thrift" is not necessarily nutritional in origin.

4. Canadian scientists (Vic Timmer and Gordon Weetman) have suggested using the weight change information when looking at foliage results from trials (figure 3).

5. Figures 4 and 5 show how the system might be applied to changes in foliar N when P is applied.

6. Figures 6 and 7 show the system applied to N and P in NN518.

7. Figure 8 shows how the system made sense of volume changes in the suite of N*P trials.

Recommendation.

We should use the system in new co-op trials.

Managers might care to use the weight and weight change information in assessing the thrift of their stands.

Normal Foliar Interpretation

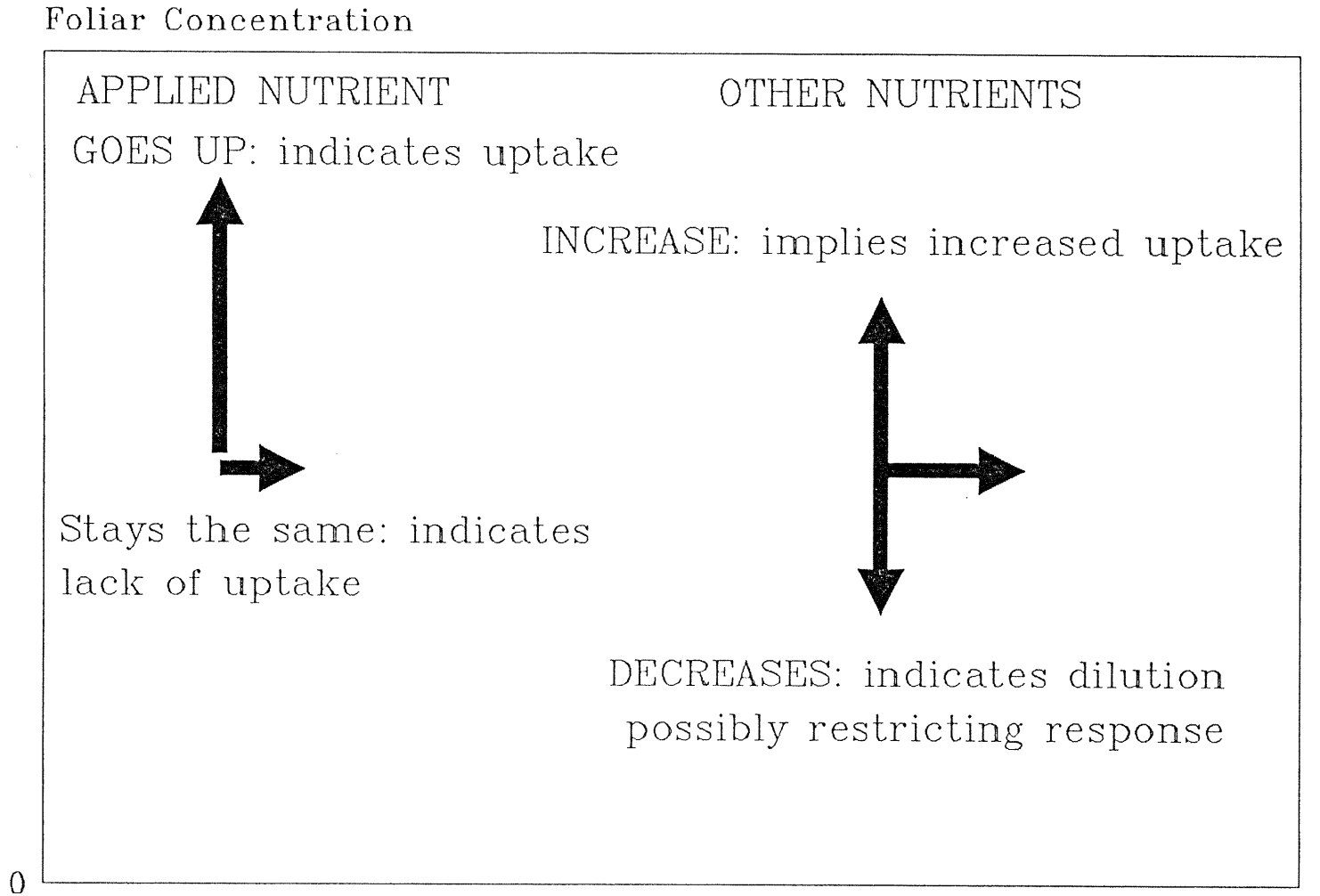


Fig 1

HOWEVER: We know that

needle weight is increased by fertilising

An unexpected byproduct of this study is the finding that needle weight is a good predictor of stand growth

Relationship of unfertilised needle weight to volume increment

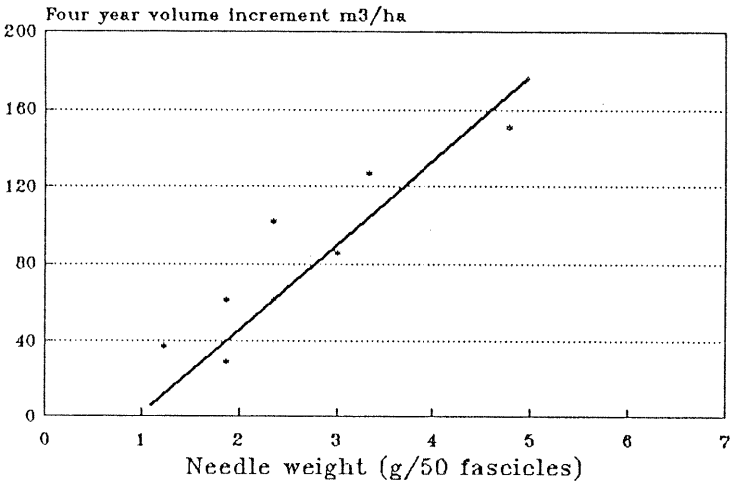
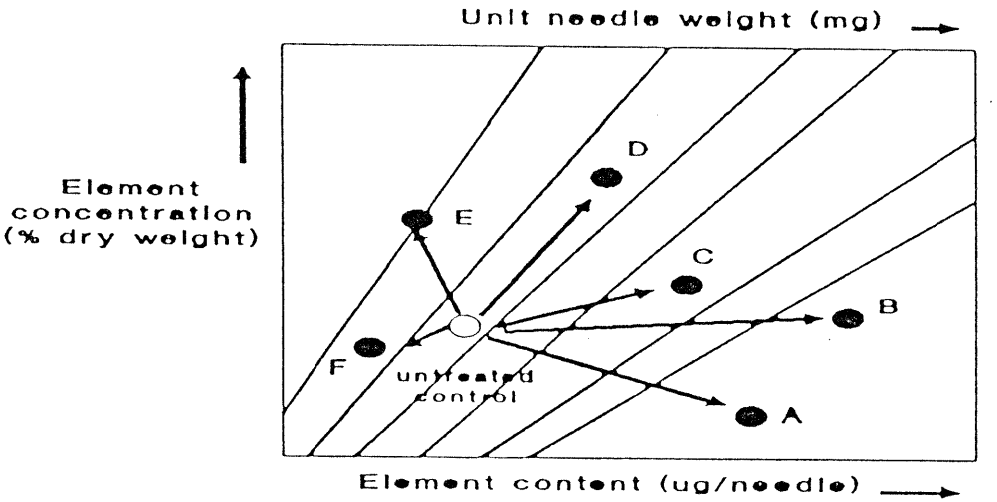


Fig 2

GRAPHICAL VECTOR ANALYSIS TECHNIQUE



Direction of shift	Response in			Interpretation	Possible Diagnosis
	Needle weight	Nutrient			
		Conc	Content		
A	+	−	+	Dilution	Non-limiting
B	+	0	+	Sufficiency	Non-limiting
C	+	+	+	Deficiency	Limiting
D	0	+	+	Luxury consumpt.	Non-toxic
E	−	++	±	Excess	Toxic
F	−	−	−	Excess	Antagonistic

Vector Analysis of Foliage
Nutrient concentration versus content

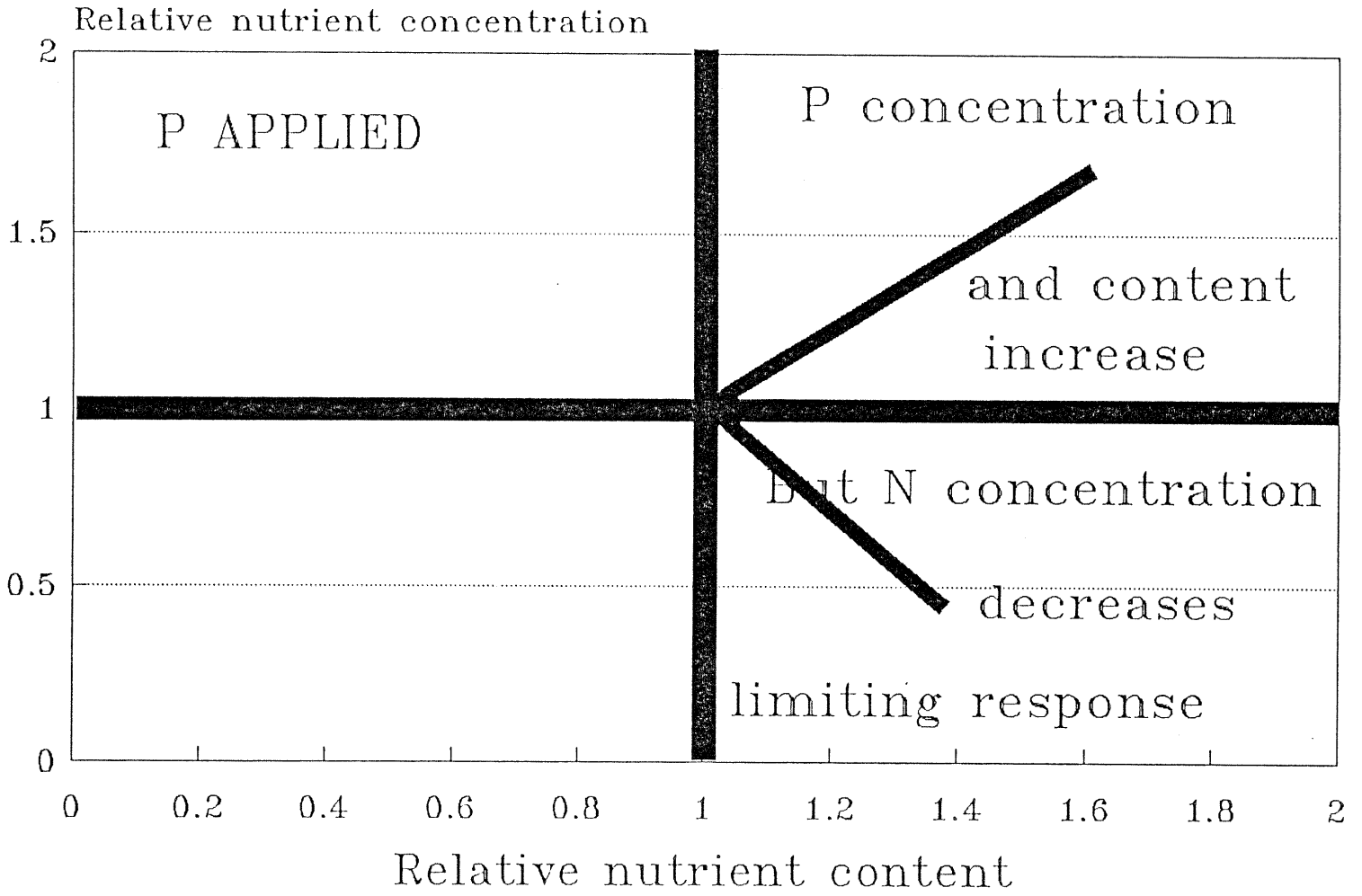


Fig 4

Vector Analysis of Foliage
Nutrient concentration versus content

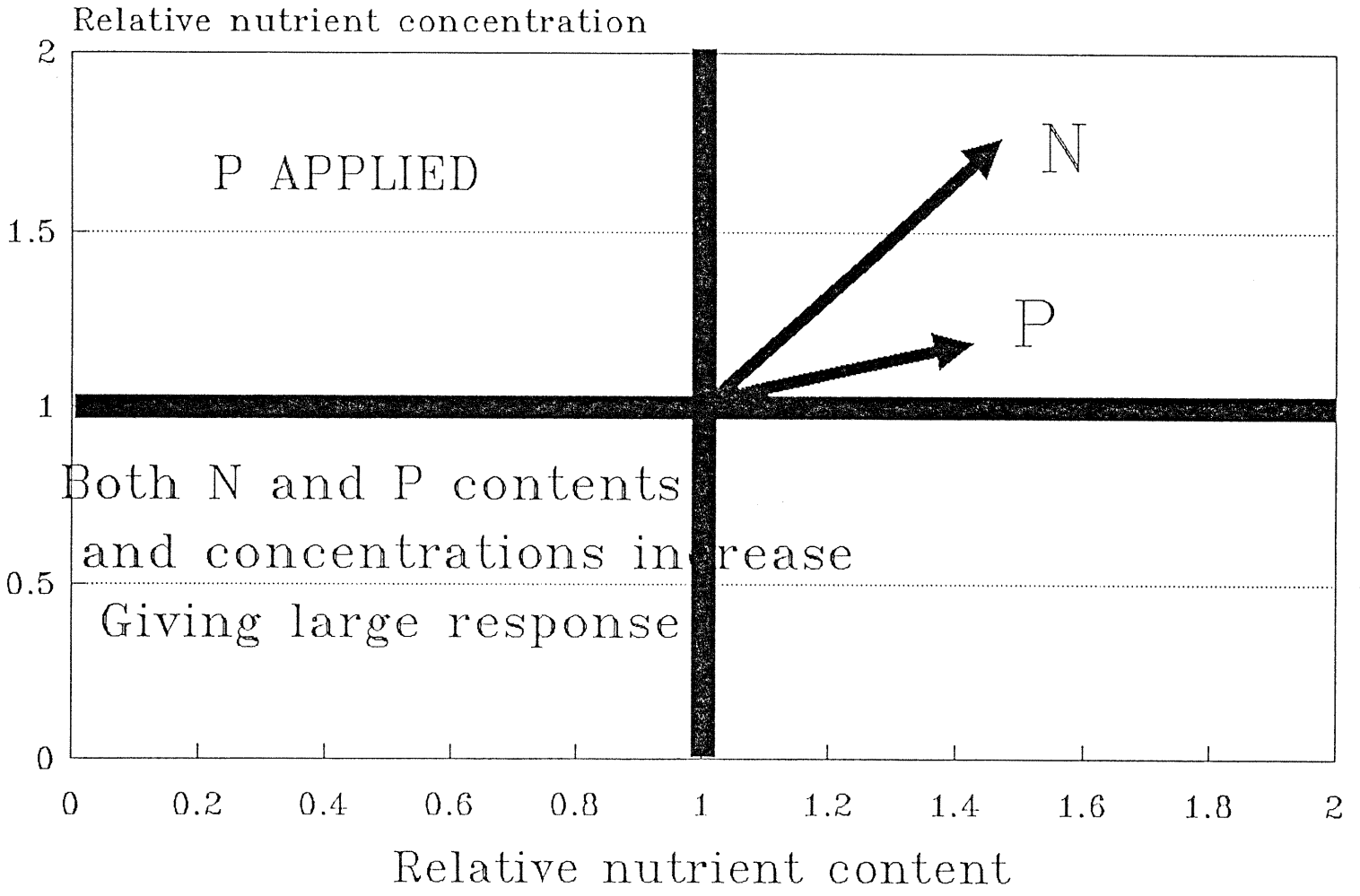


Fig 5

NN518 Vectors
Phosphorus

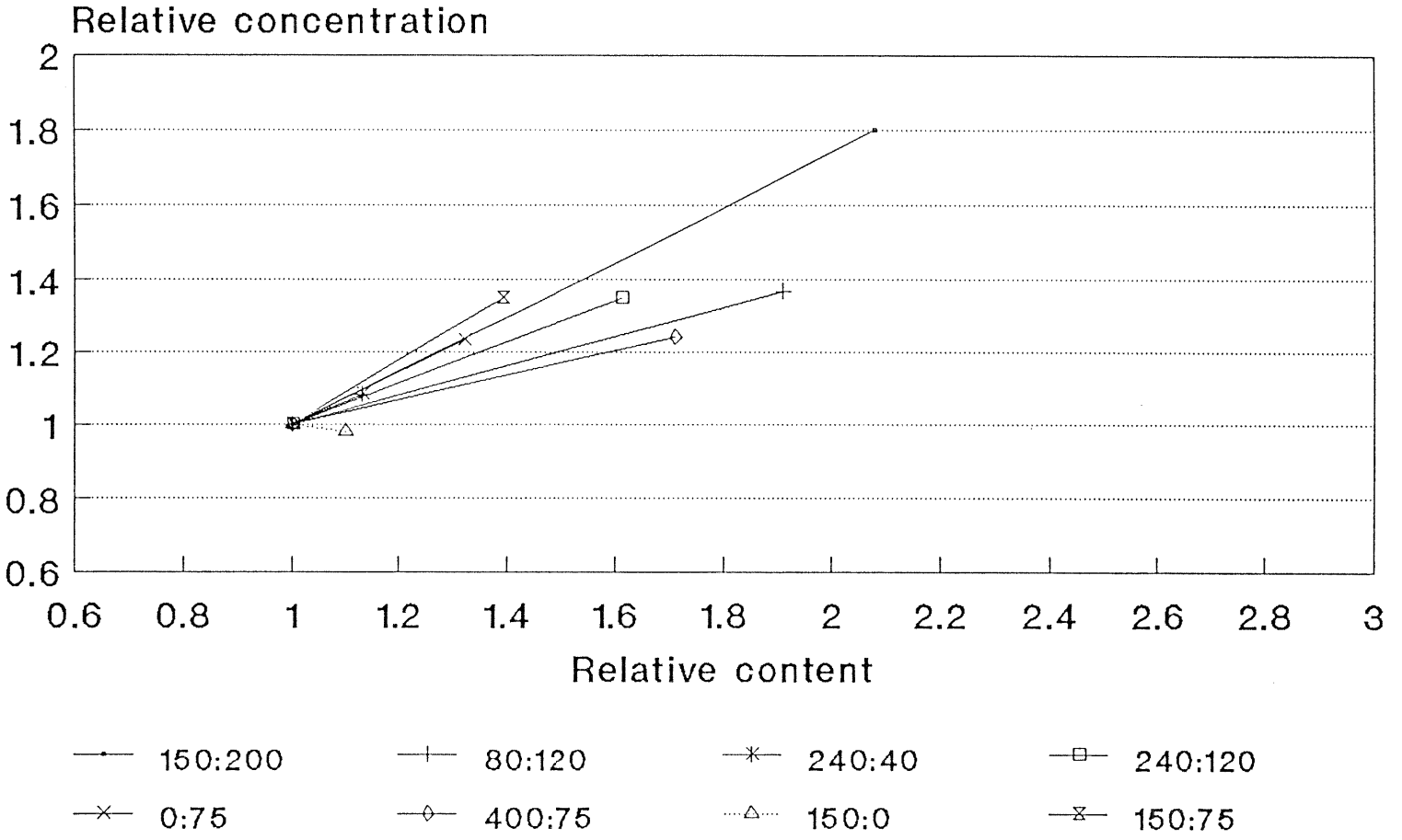


Fig 6

NN518 Vectors
Nitrogen

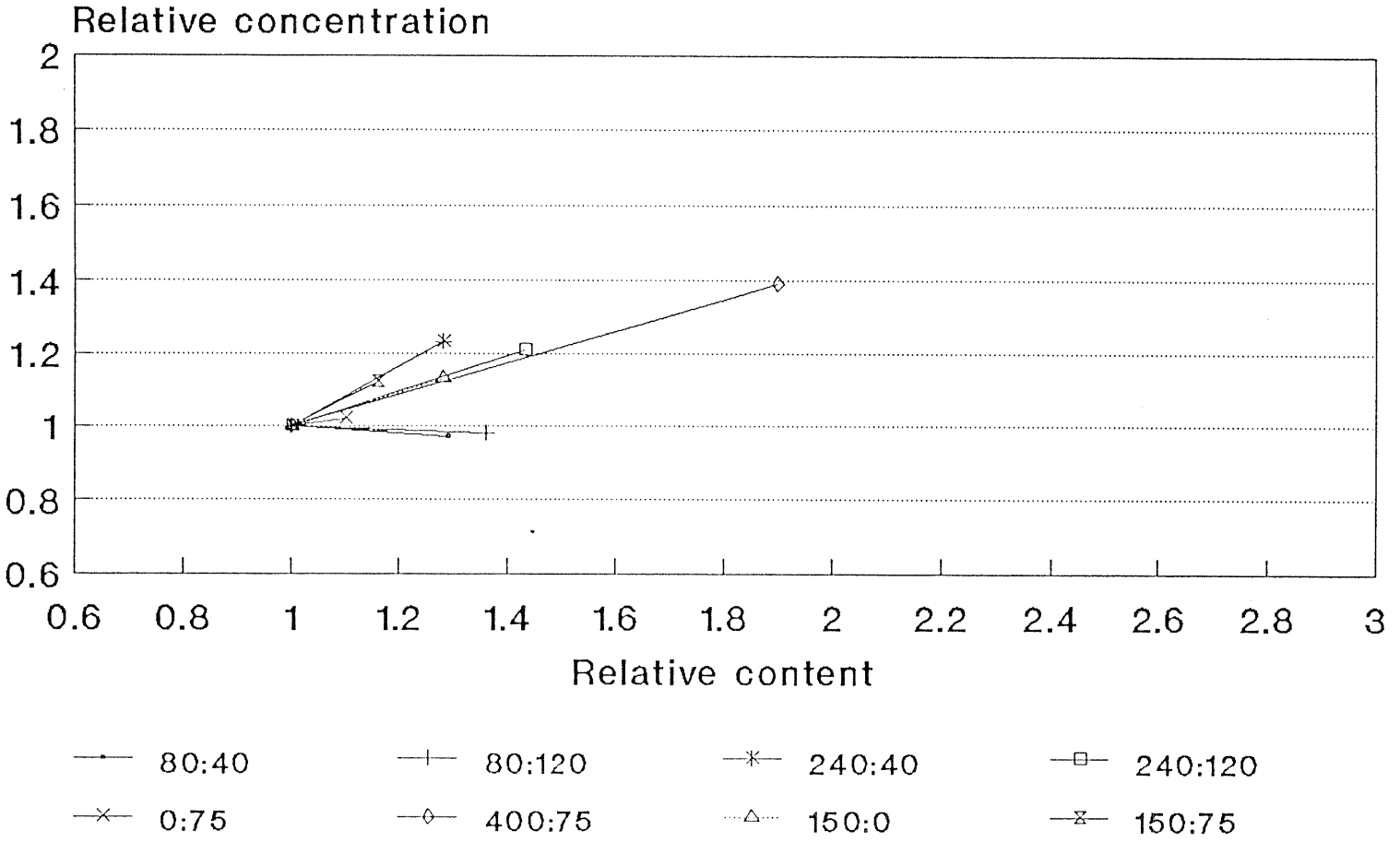


Fig 7

Vector Analysis

What happened to N	What happened to P	Volume response
N diluted	P "deficient"	13.1
N "deficient"	P diluted	5.3
N "deficient"	P "deficient"	21.3
N "antagonised"	P "deficient"	6.6
N "deficient"	P "antagonised"	− 6.8

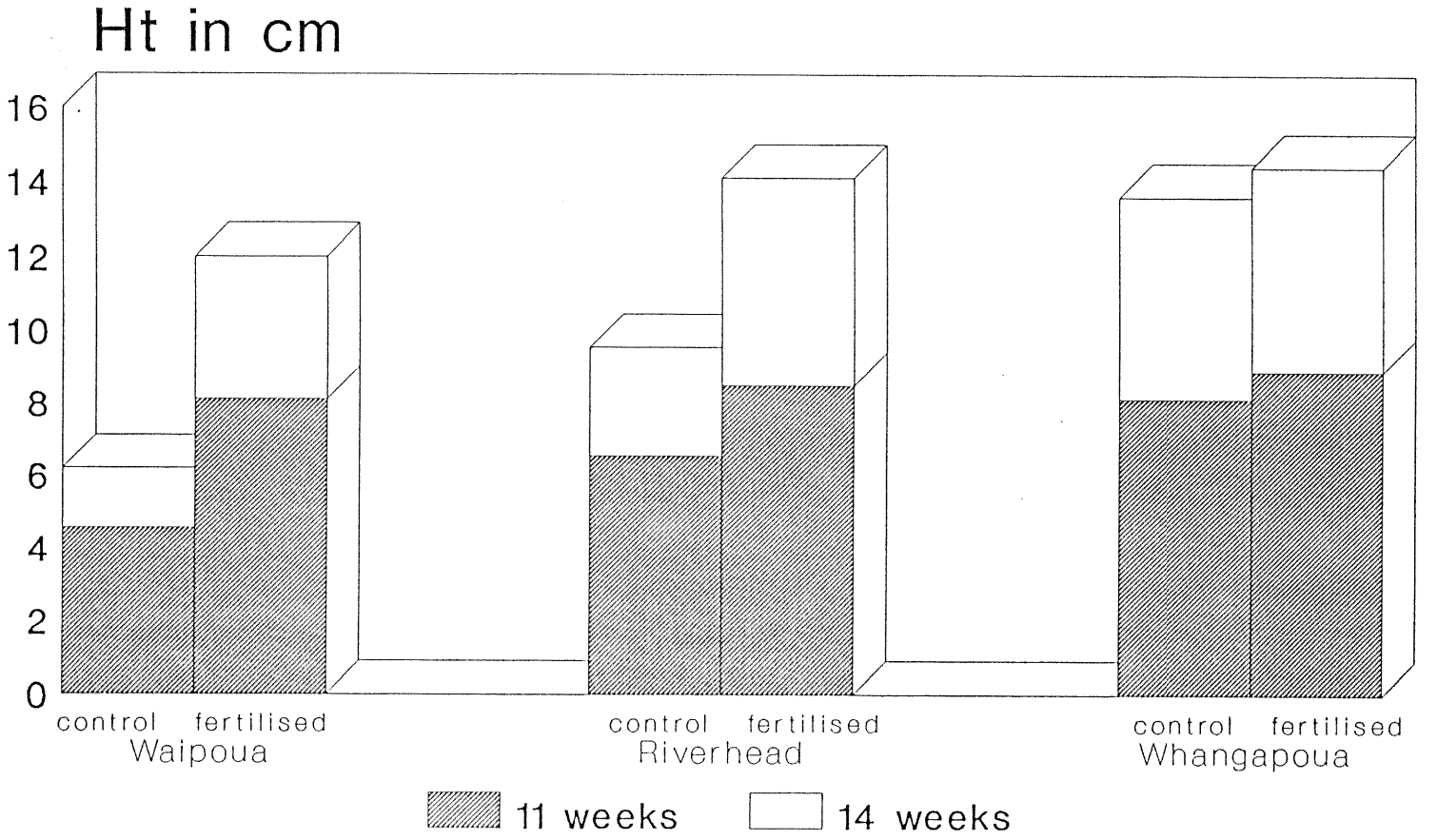
Fig 8

APPENDIX 3

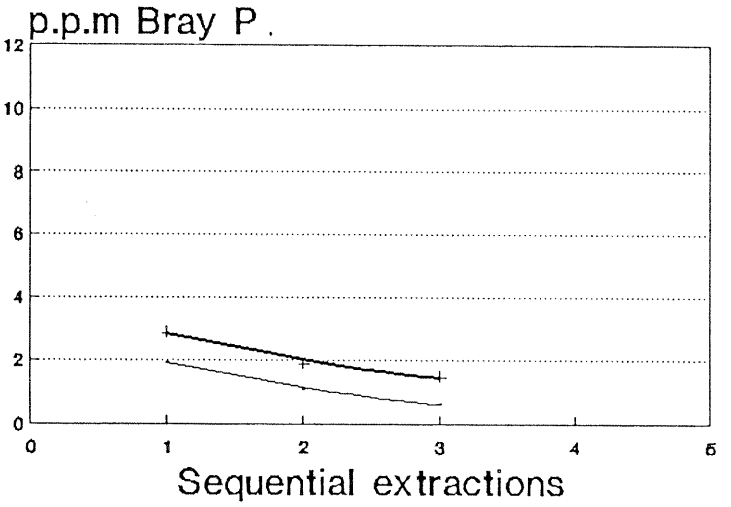
SOIL PHOSPHORUS TESTING

MALCOLM SKINNER

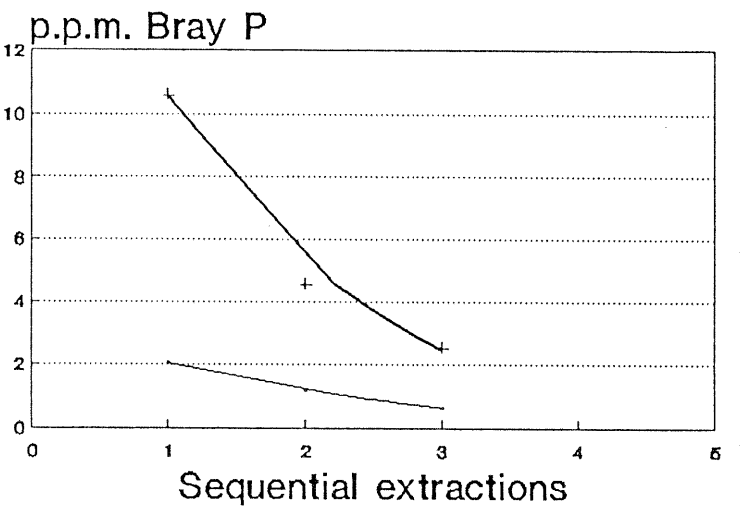
Pot Trial
Seedling heights after 14 weeks



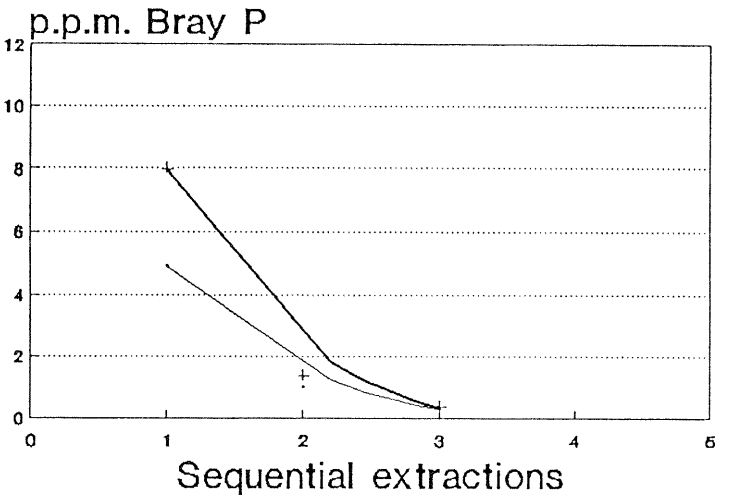
Waipoua soils



Riverhead soils



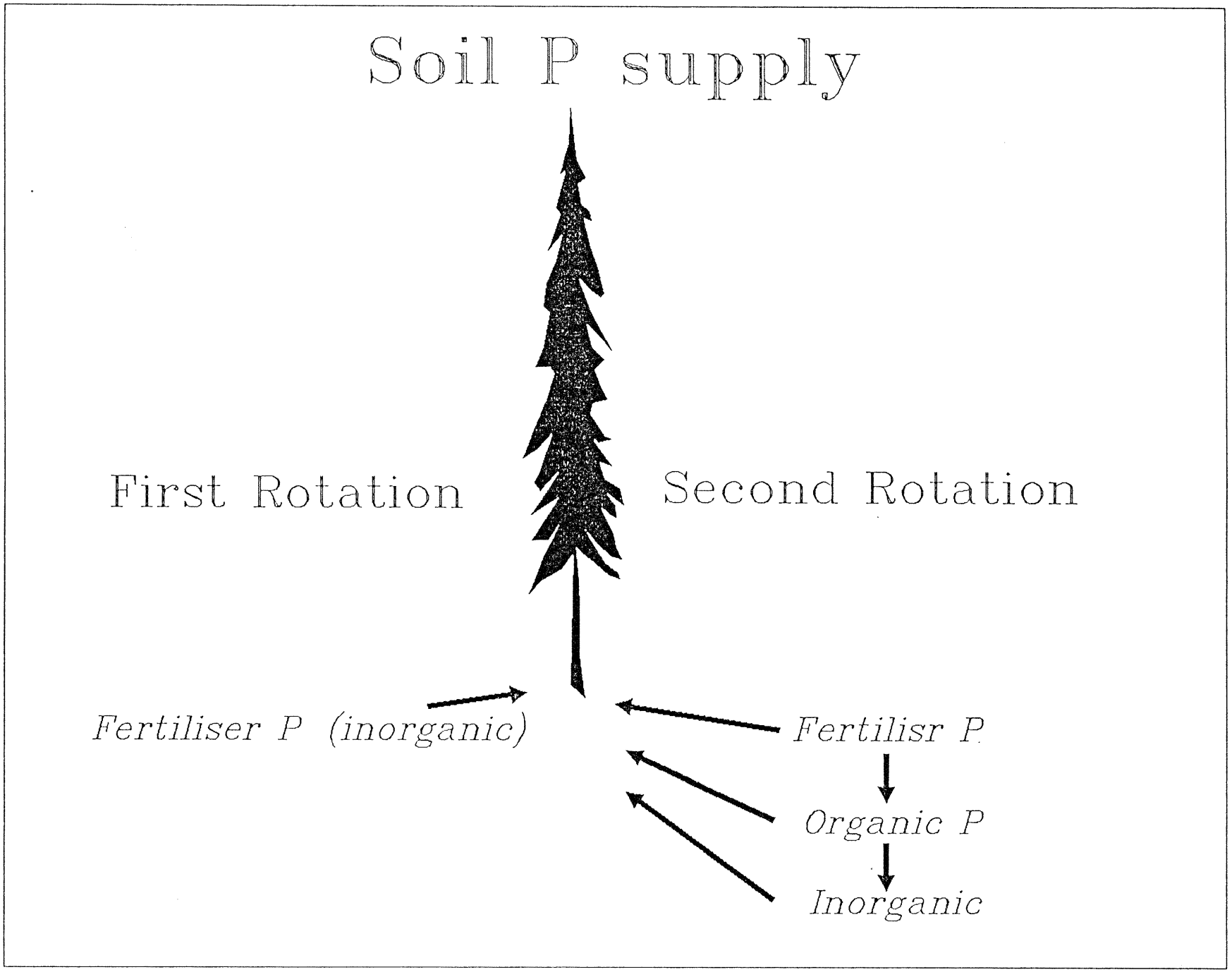
Whangapoua soils



Compares extractable Bray-P from second rotation soils with contrasting P fertiliser histories for the first rotation

Unfertilised

fertilised


Soil P supply
First Rotation
Second Rotation
Fertiliser P (inorganic)
Fertilisr P
Organic P
Inorganic