

*Specific Leaf Area Response
of Selected Forest
Health/Nutrition Experimental
Sites Following Treatment.*



Jesse Nippert and John Marshall

Presentation Objective:

To exhibit the sensitivity of SLA to regional spatial, temporal, intra-specific, and silvicultural variation



Experimental Sites Selected

→ *Established between 1994-96*

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- *3-state region*
- *Four Treatments*
 - *N (336 kg/ ha)*
 - *K (224 kg/ha)*
 - *N+K (336+224 kg/ha)*
 - *Control (unfertilized)*

Sampling Design

→ *Two Canopy Positions*

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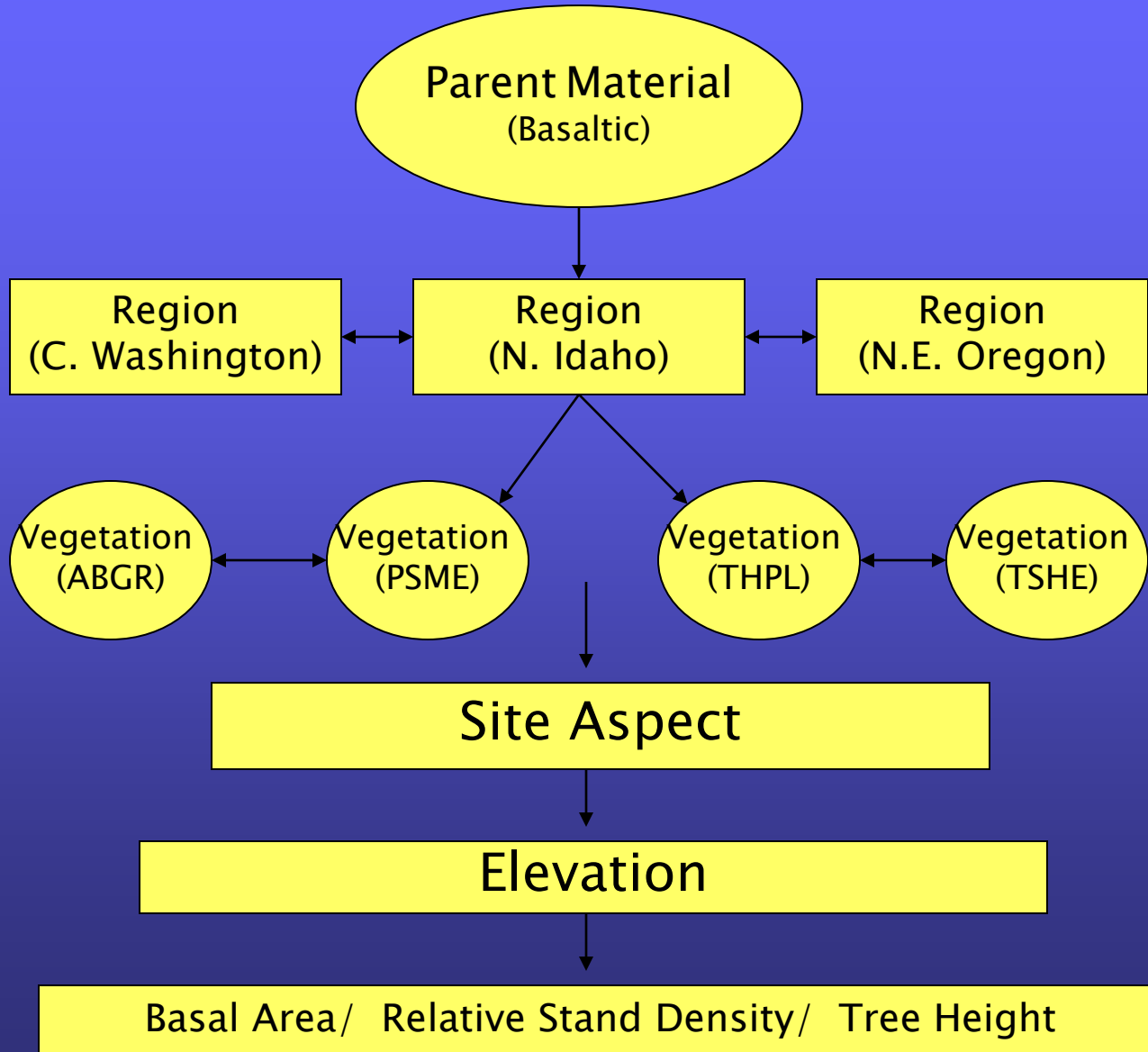
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- *Two Species Measured*
 - *Pseudotsuga menziesii* var. *glauca*
 - *Abies grandis*
- *Within each of four treatments*
- *At all eight sites selected*
- *For three summer sampling periods*
 - *Late May/ June*
 - *July*
 - *September*

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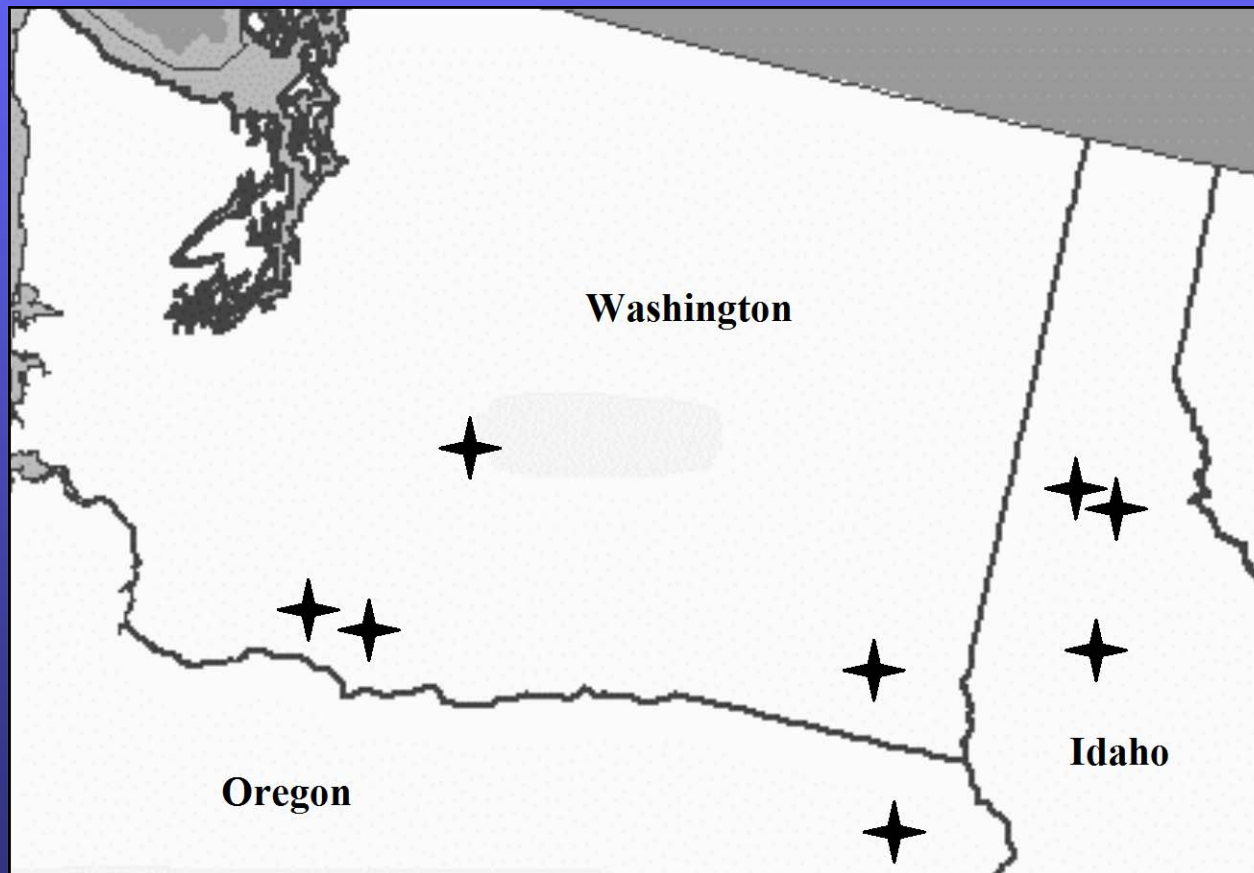
Site Selection Criteria



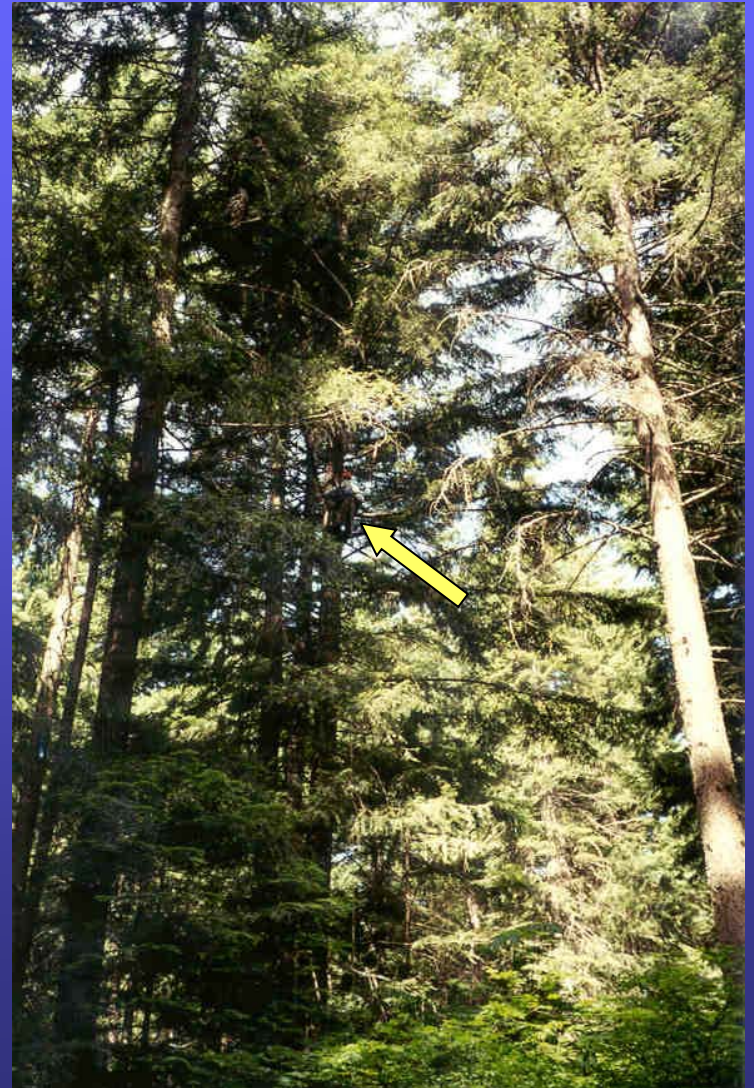
Site Characteristics

Site Name	Location	Latitude/ Longitude	Vegetation Series	Site Aspect	Elevation (m)	Live Basal Area (m ² /ha)	Relative Density Index	Avg. Tree Height (m)
Soldier Creek	Northern Idaho	47N19/ 116W34	TSHE	202°	976	34.4	51	19.8
Sportsman's Access	Northern Idaho	47N19/ 116W34	TSHE	337°	945.5	18.8	27	23.8
Dick's Creek	Northern Idaho	46N29/ 116W15	THPL	0°	915	37.8	55	24.4
Upper Pataha #2	South-eastern Washington	46N29/ 117W36	ABGR	45°	1,525	6.2	12	7.3
Enterprise	North-eastern Oregon	45N26/ 117W17	PSME	247°	1,433.5	26.4	37	21.4
Cleman Mountain #2	Central Washington	46N44/ 120W42	PSME	180°	1,037	26.4	32	21.7
BZ Corner #2	South-central Washington	45N44/ 121W29	ABGR	112°	579.5	64.2	70	37.2
Snowden Mountain #2	South-central Washington	45N44/ 121W29	PSME	0°	671	33.3	40	29

Site Distribution



Foliar Samples



Specific Leaf Area



Foliar Percent Nitrogen



→ *I.S.I.L.*

→ *EA-IRMS*

$$\%N = \frac{(N \text{ mg} * 100)}{\text{leaf wt. mg}}$$

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→ *Used 'Linear mixed-effects models'*

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*ex:) SLA ~ Position + Species + Treatment + Visit + %N,
random = ~1 | Site / Species*

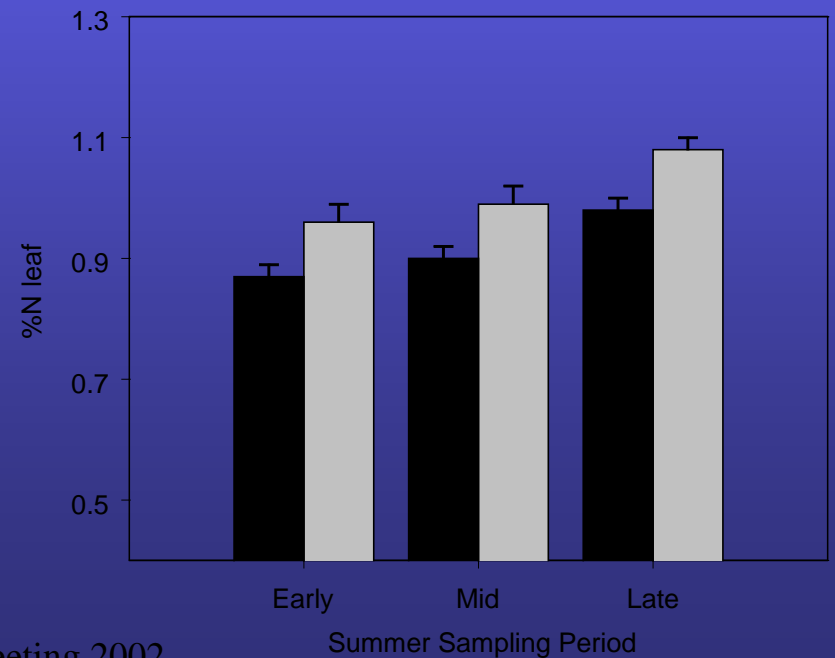
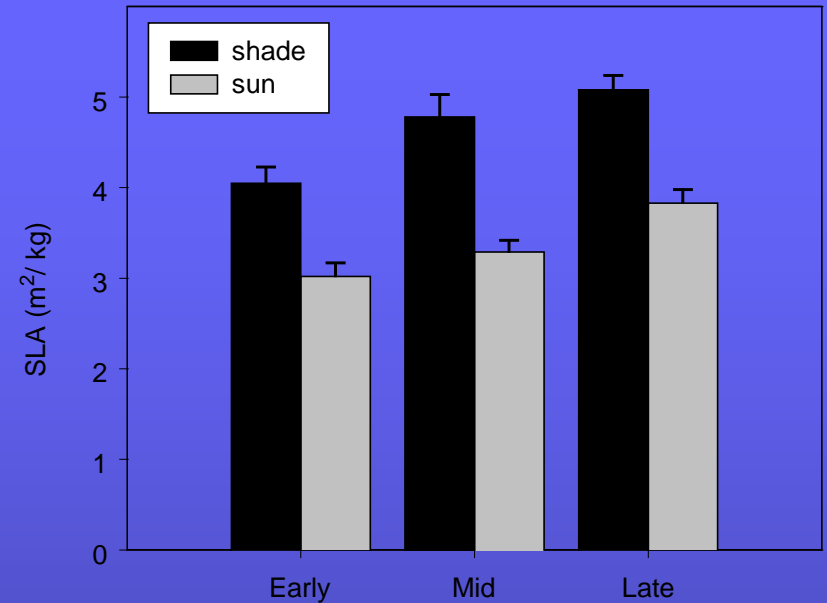
Results -ANOVA

	Canopy Position	Summer Period	Fertilizer Treatment	Species	%N
SLA	< 0.0001	< 0.0001	0.016	0.04	0.007
%N	< 0.0001	< 0.0001	0.3543	0.0173	

Results

SLA and %N by position and summer sampling period

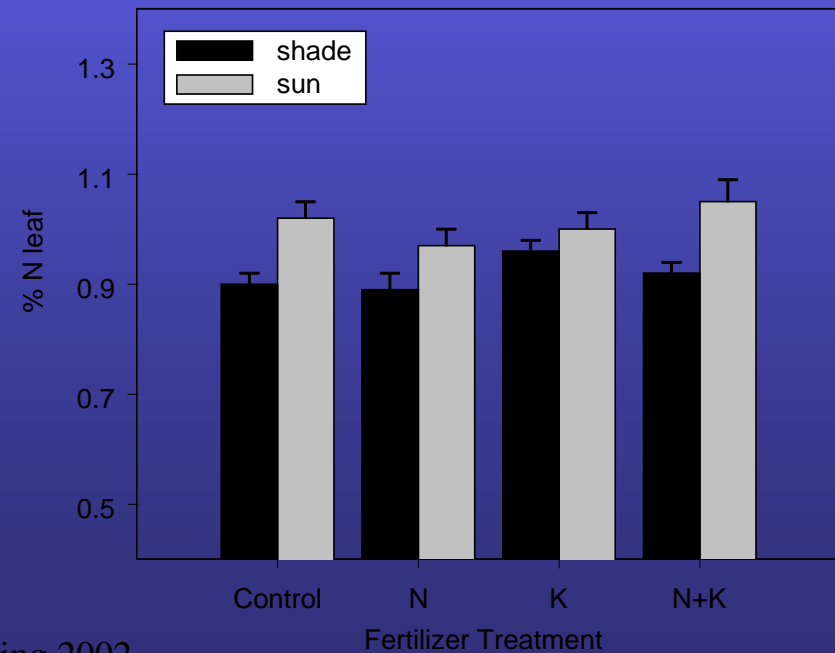
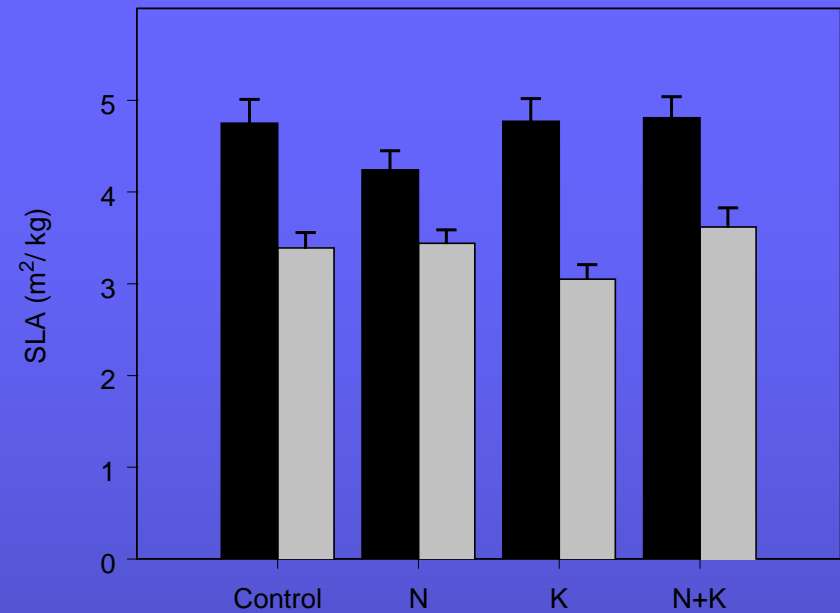
Error bars represent ± 1 SE



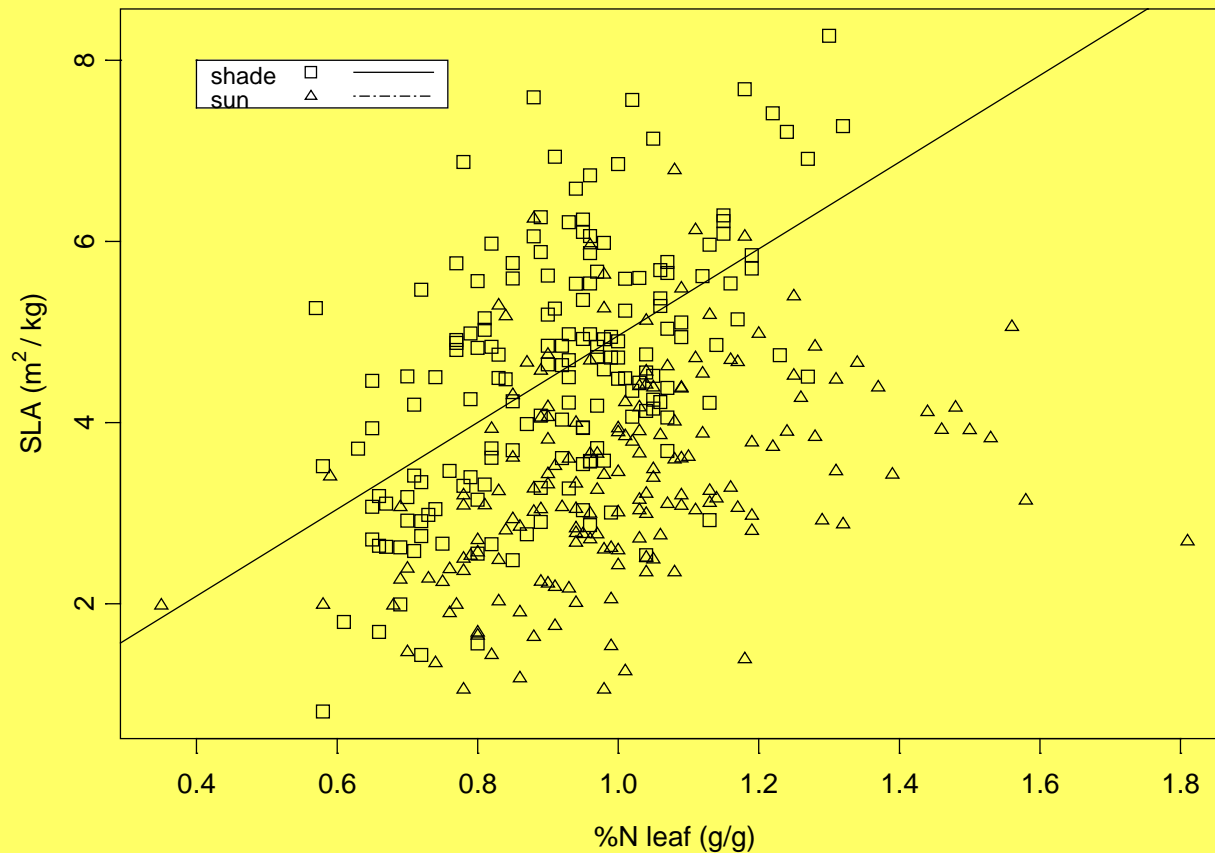
Results

SLA and %N by position and fertilizer treatment prescribed at each site visited

Error bars represent ± 1 SE



Results



*Lines are ordinary
least squares
regression fit to
data*

Residual S.D.

Sun- $1.151 \text{ m}^2/\text{kg}$

Shade- $1.048 \text{ m}^2/\text{kg}$

Conclusions

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- *No treatment differences*
- *'Everything's Significant!'*
 - *implications for physiological process models*

Acknowledgments

- *Jim Moore and the IFTNC*
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