Tall Fescue Seedling Response to Phosphorous Fertilization

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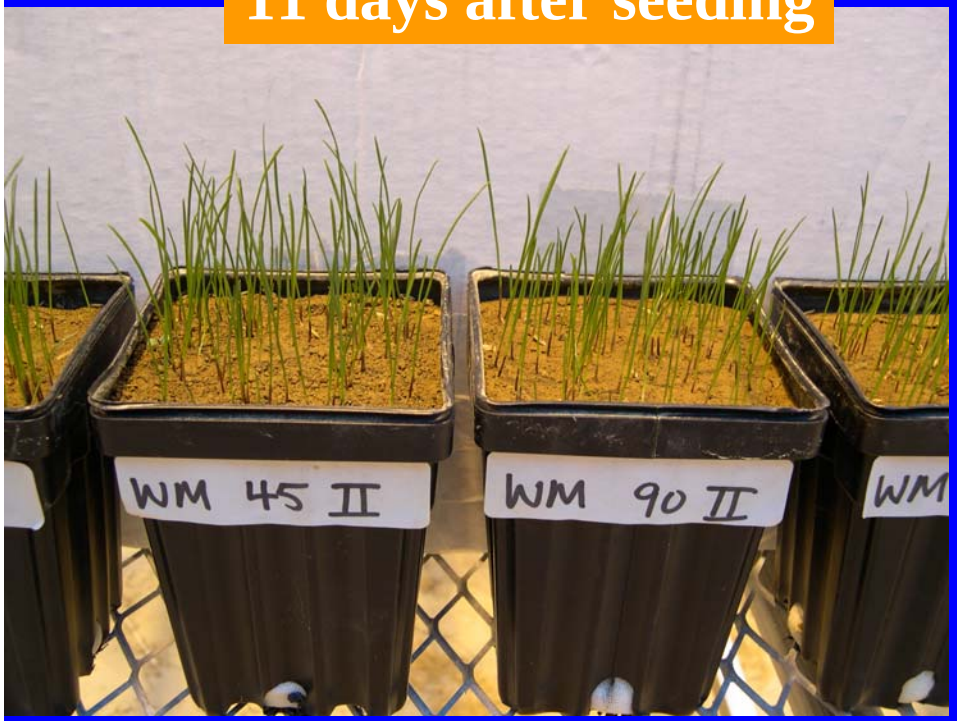
Rational for Adding P at Seeding

Newly developing plant requires lots of P for initial growth and development

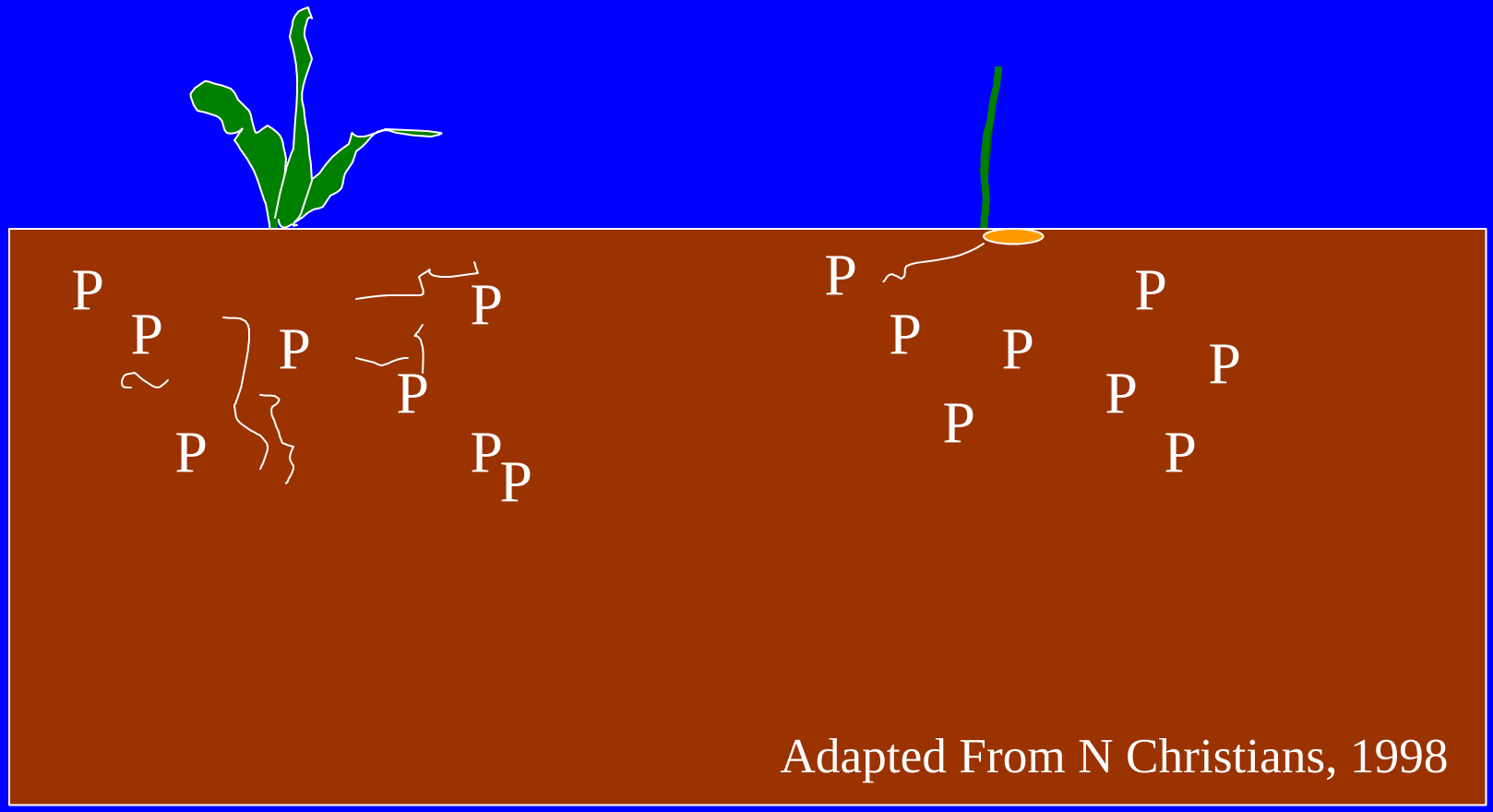
11 days after seeding



30 days after seeding

Rational for Adding P at Seeding

Limited root system at early stages of growth limits plants ability to extract P from soil



Rational for Adding P at Seeding

Improved turf cover resulting from P additions made at seeding will reduce the potential for sediment and nutrient runoff

Late 1990's Pfiesteria Outbreaks

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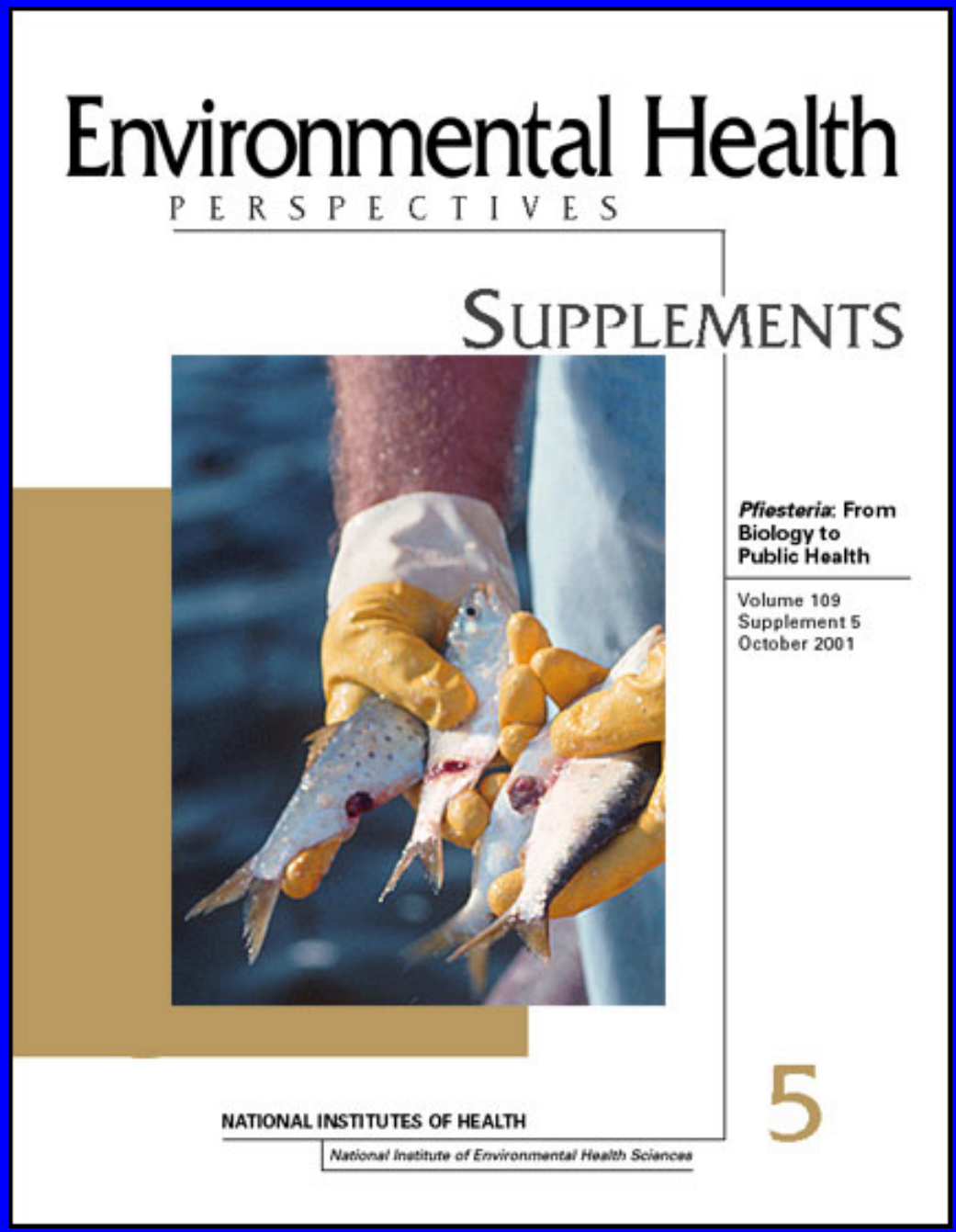
Maryland Water Quality Improvement Act of 1998

↓

Nutrient Management Regulations



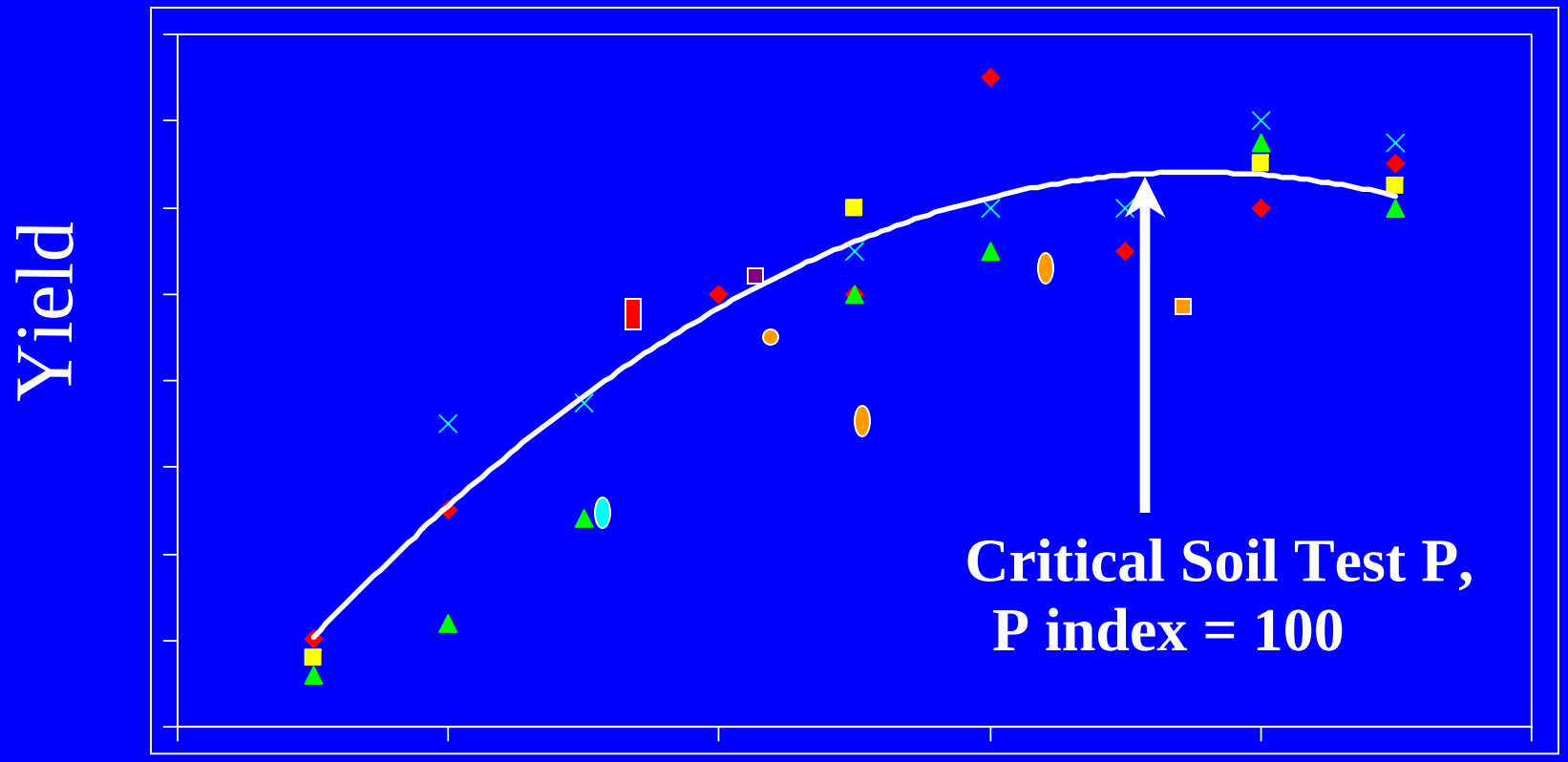
Questions

Will the addition of Phosphorus to a seed bed already high in soil test P hasten turf establishment ?

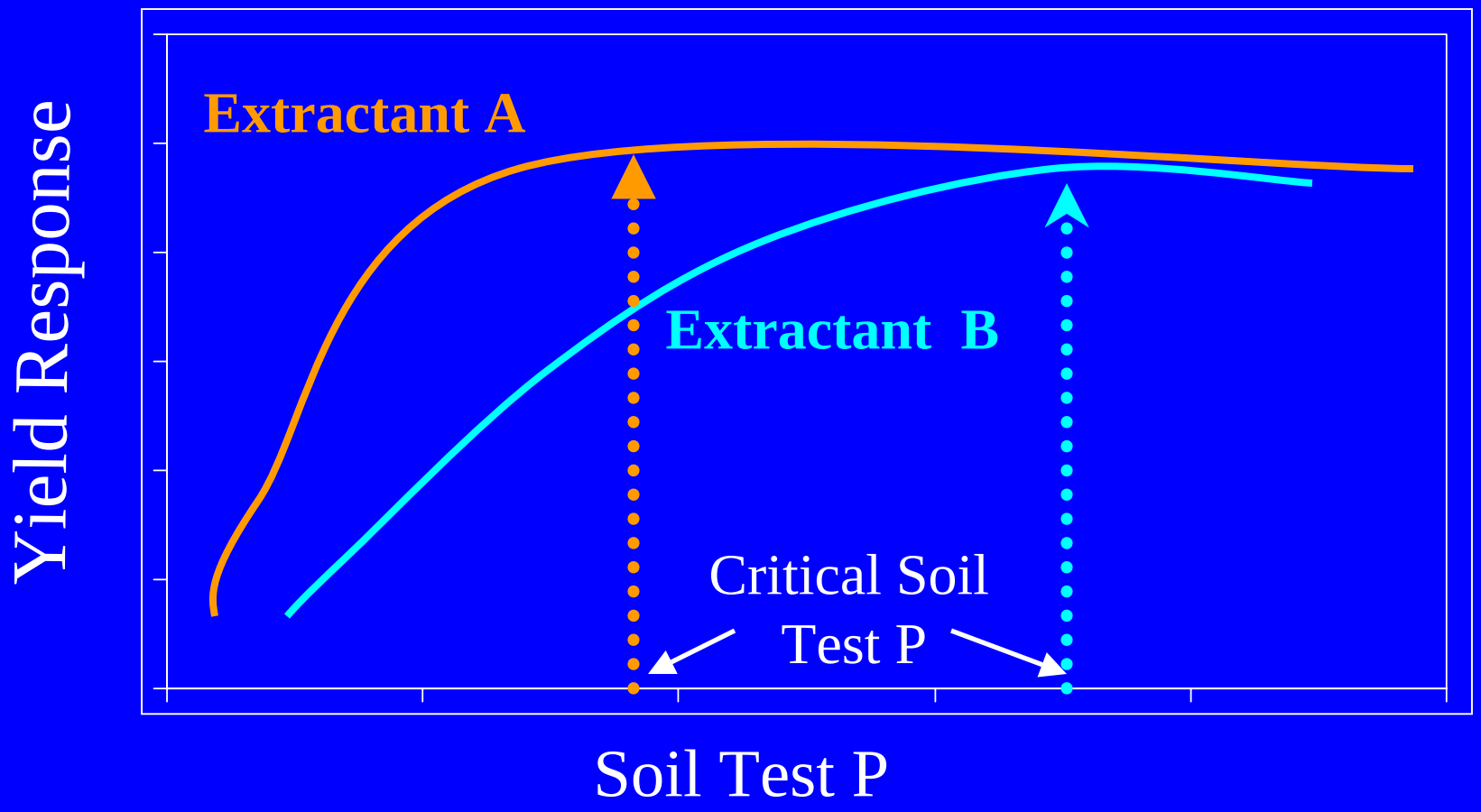
Does the P requirement for optimal establishment vary with seeding date ?

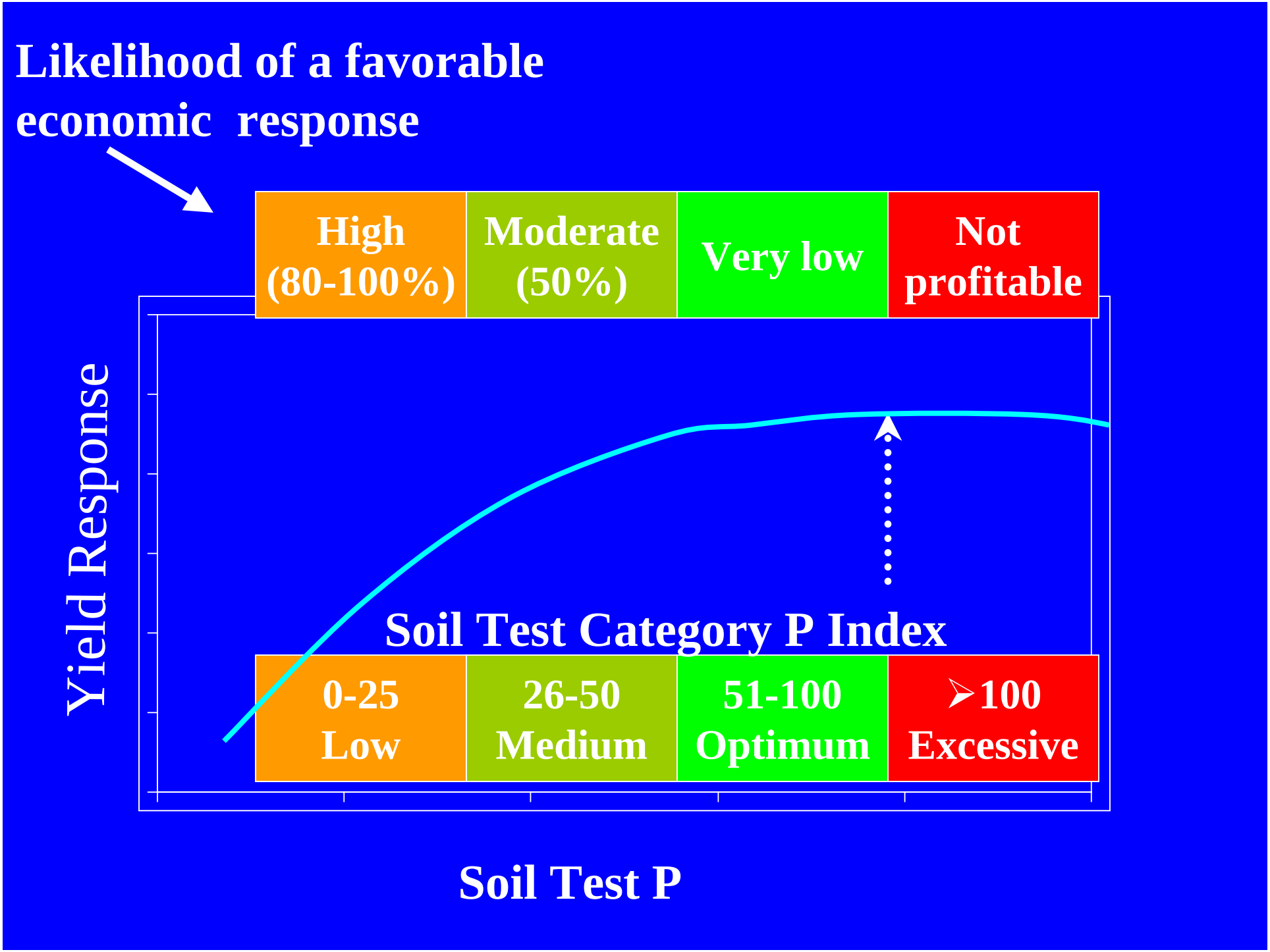
Which fertilization practice will best facilitate rapid turf establishment, leaving P on the surface or incorporating the same amount of P into the soil ?

Soil Test Calibration

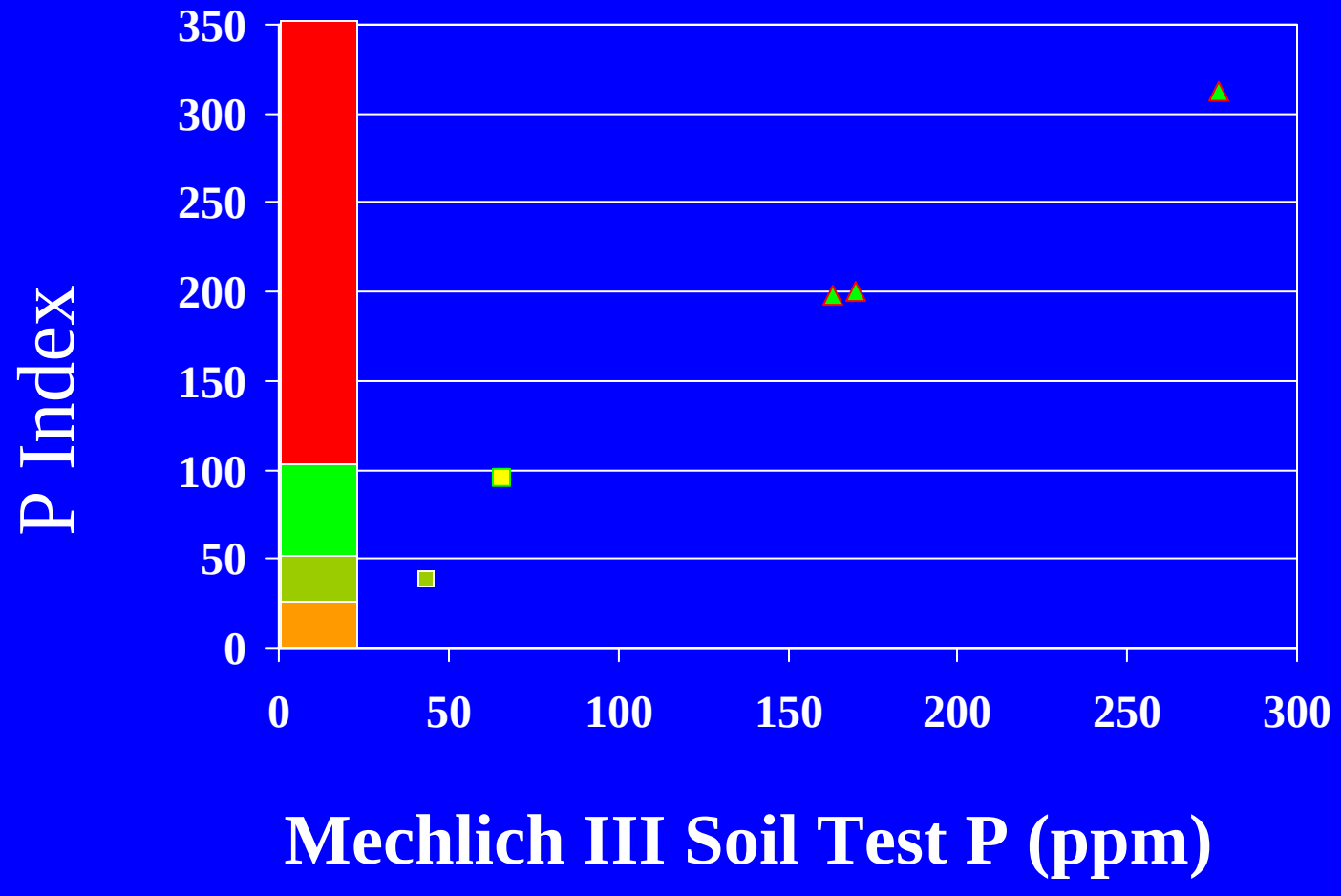


Critical Soil P for two Extracting Solutions



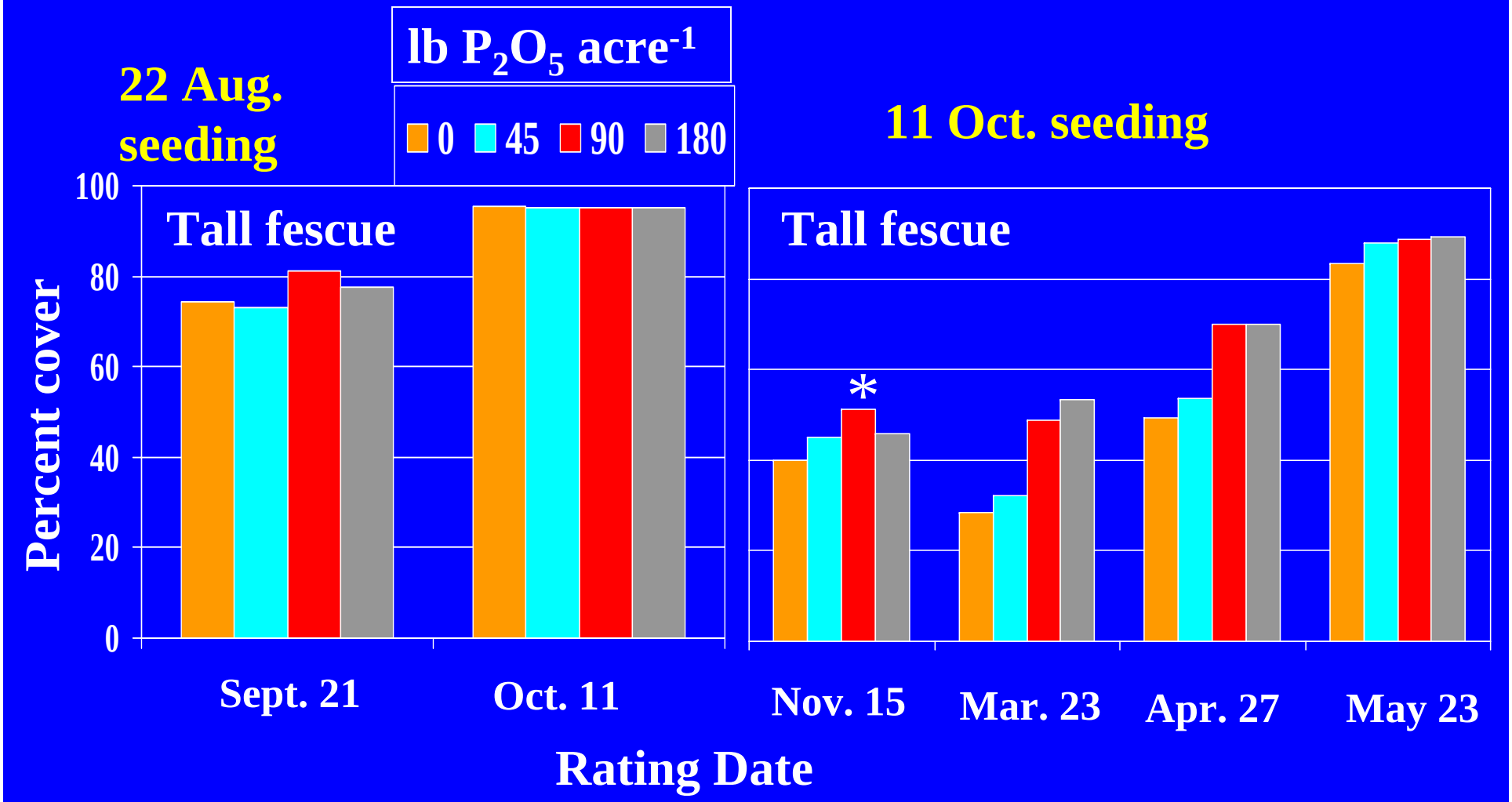

Likelihood of a favorable economic response
High (80-100%)
Moderate (50%)
Very low
Not profitable
Yield Response
Soil Test Category P Index
0-25 Low
26-50 Medium
51-100 Optimum
➢100 Excessive
Soil Test P

Soil Test P and Soil Fertility P Index of the Soils Examined in the Field Investigations



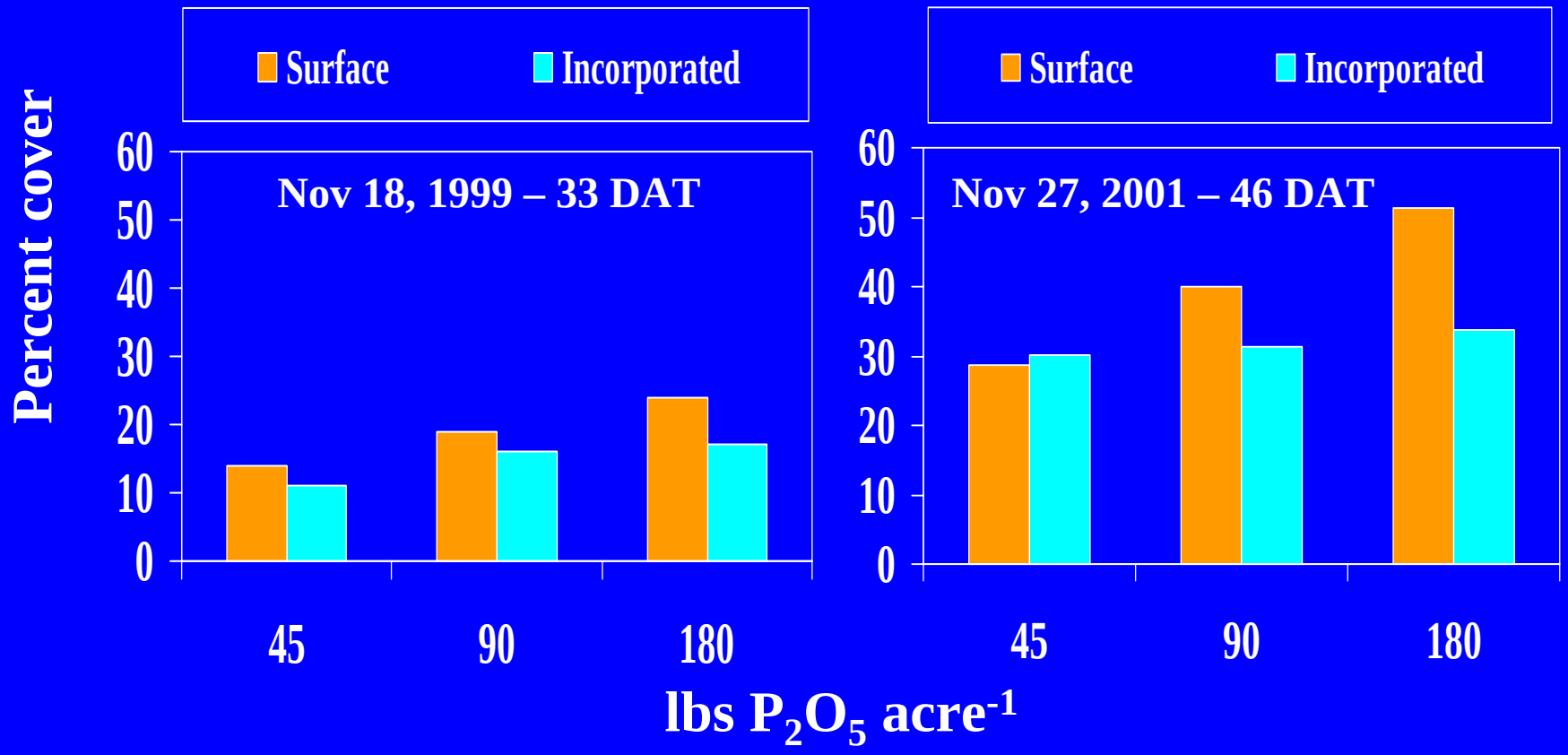
Effect of Seeding Date on P Response

Western MD, optimum soil test P

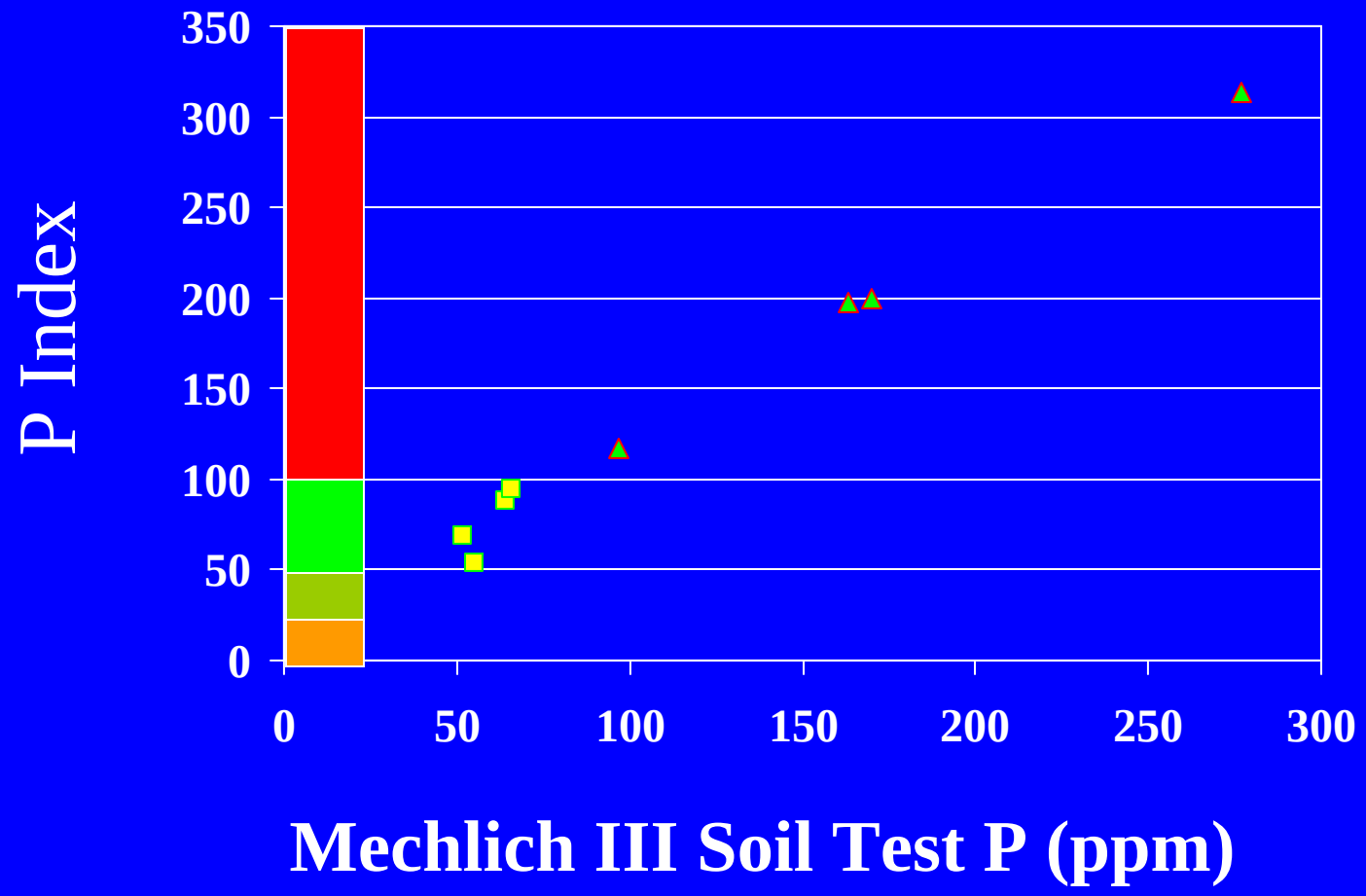


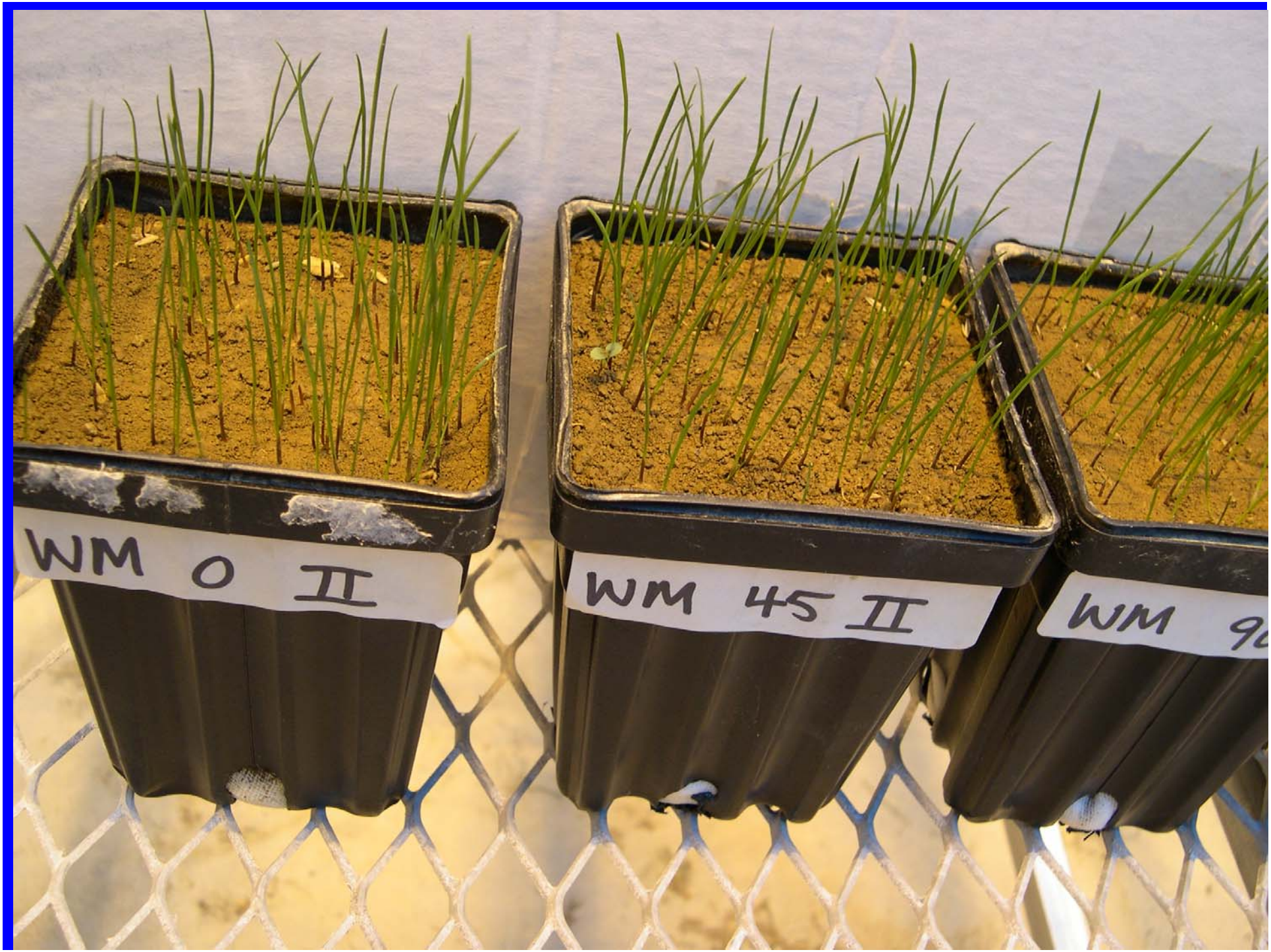
Effect of P Placement on Tall Fescue Establishment

UM turf farm, medium soil test P



Soil Test P and Soil Fertility P Index of Soils Used in Greenhouse Investigation




WM 0 II
WM 45 II
WM 90

23 days warm regime

23 days cool regime

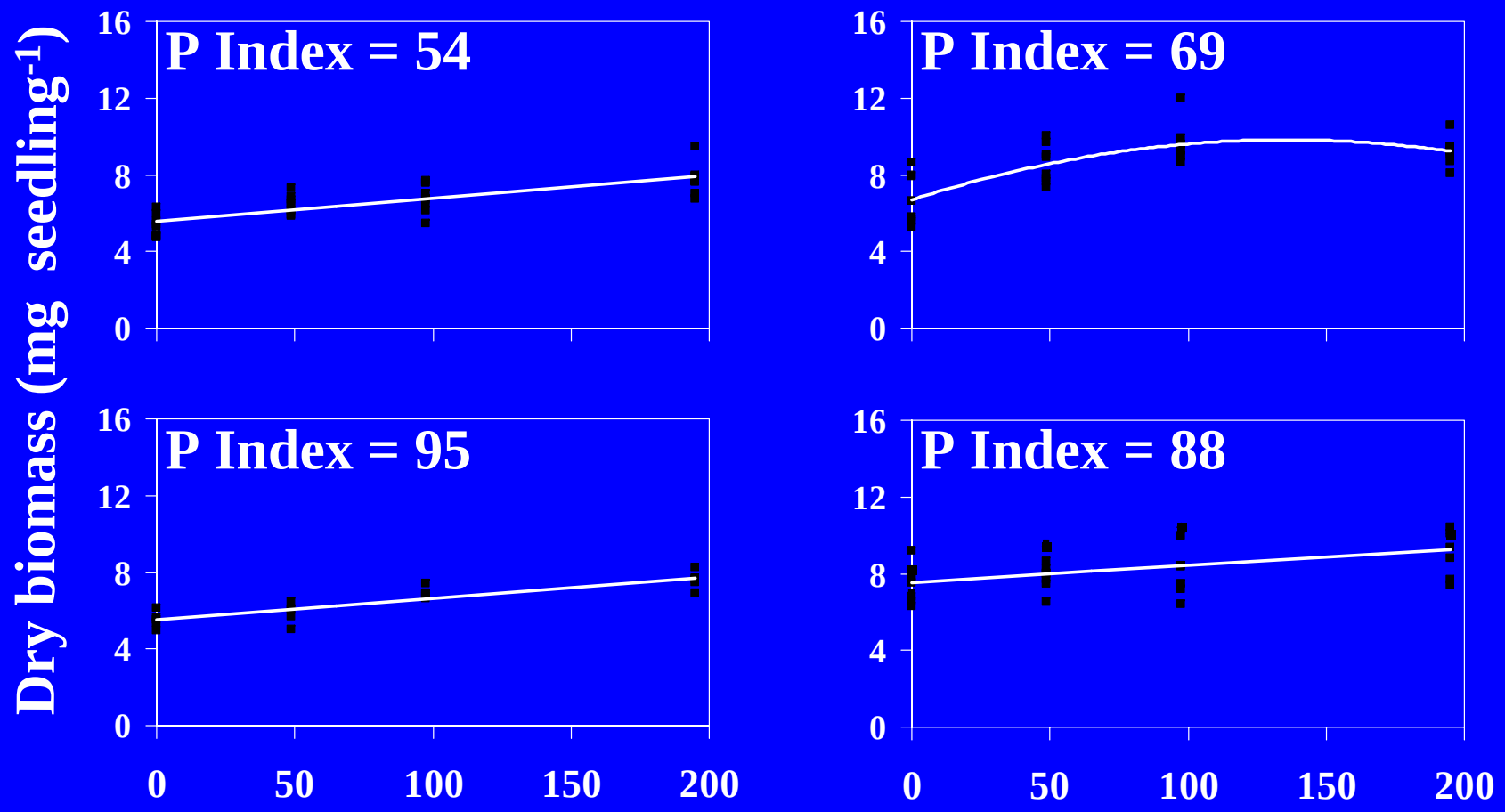
42 day cool regime

Warm Temperature Regime
59 to 77 F

Soil P- Index	Seedling response to P fertilization
313	NO
200	NO
198	NO
117	NO
95	YES
88	YES
69	YES
54	YES

Tall Fescue Seedling Response to P Fertilization

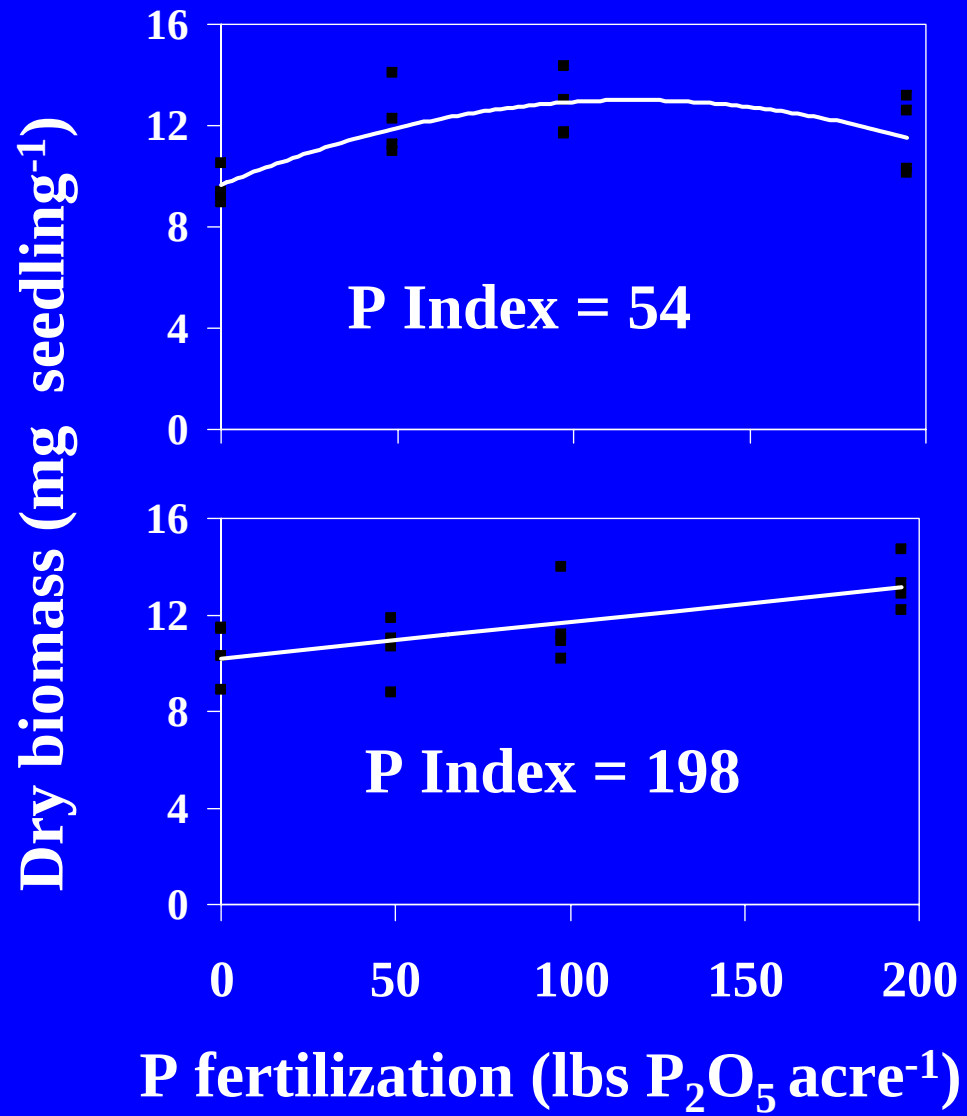
warm temp regime (59 to 77 F)



Cool Temperature Regime
41 to 59 F

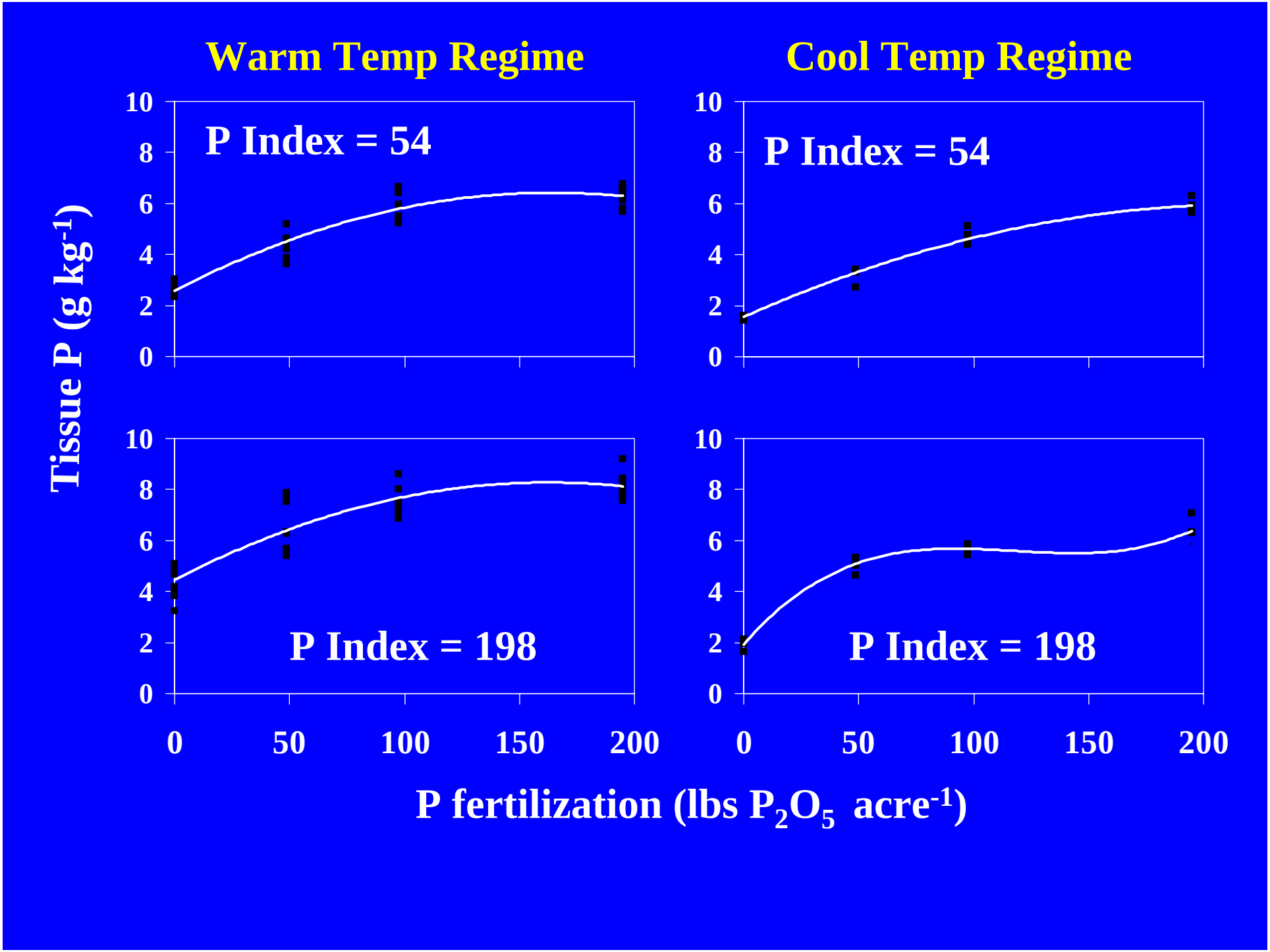
Soil P- Index	Seedling response to P fertilization
313	NO
200	NO
198	YES
54	YES

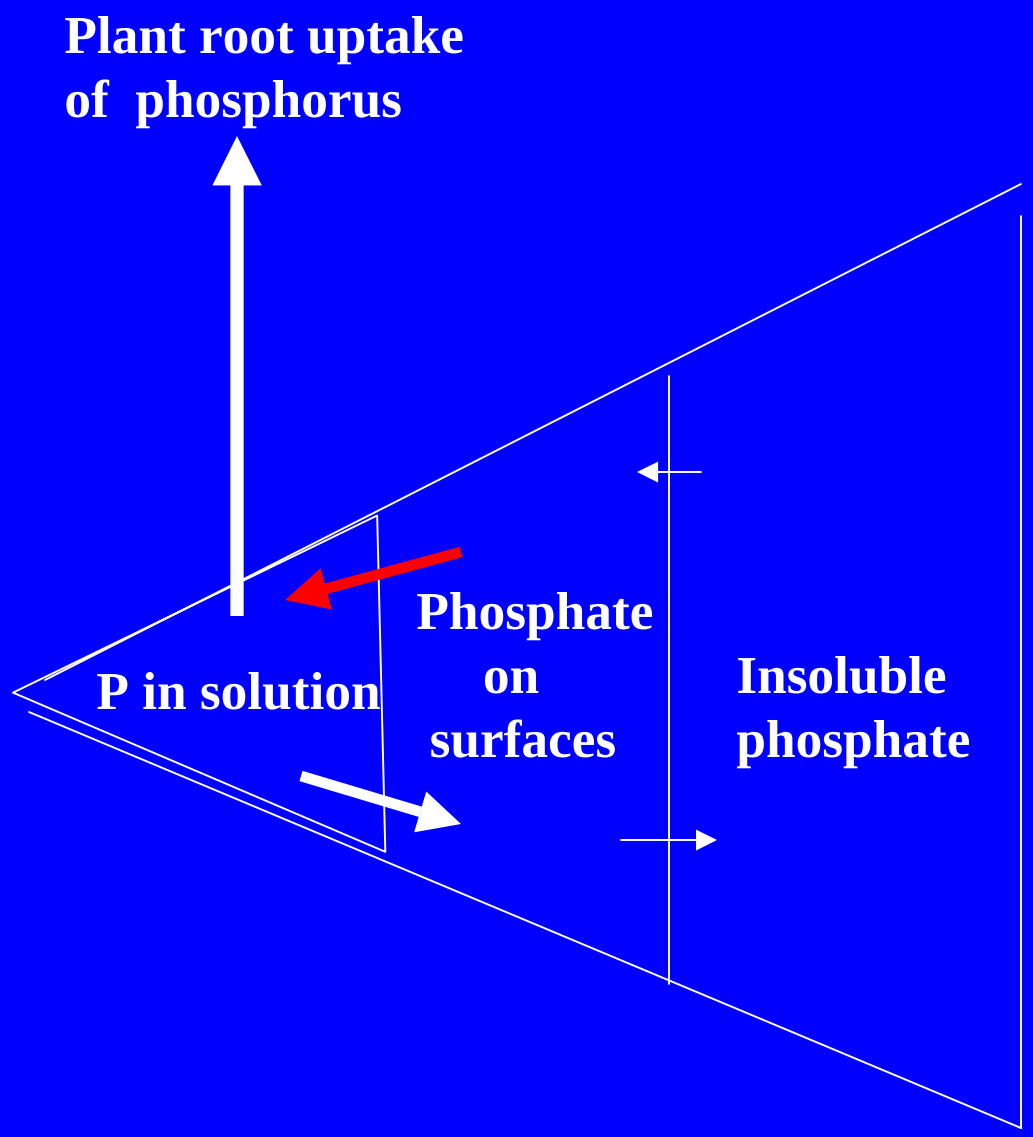
Tall Fescue Seedling Response to P Fertilization



cool temperature regime

(41 to 59 F)


Warm Temp Regime
Cool Temp Regime
P Index = 54
P Index = 54
P Index = 198
P Index = 198
Tissue P (g kg-1)
P fertilization (lbs P2O5 acre-1)
0
2
4
6
8
10
0
50
100
150
200


Plant root uptake
of phosphorus
P in solution
Phosphate
on
surfaces
Insoluble
phosphate

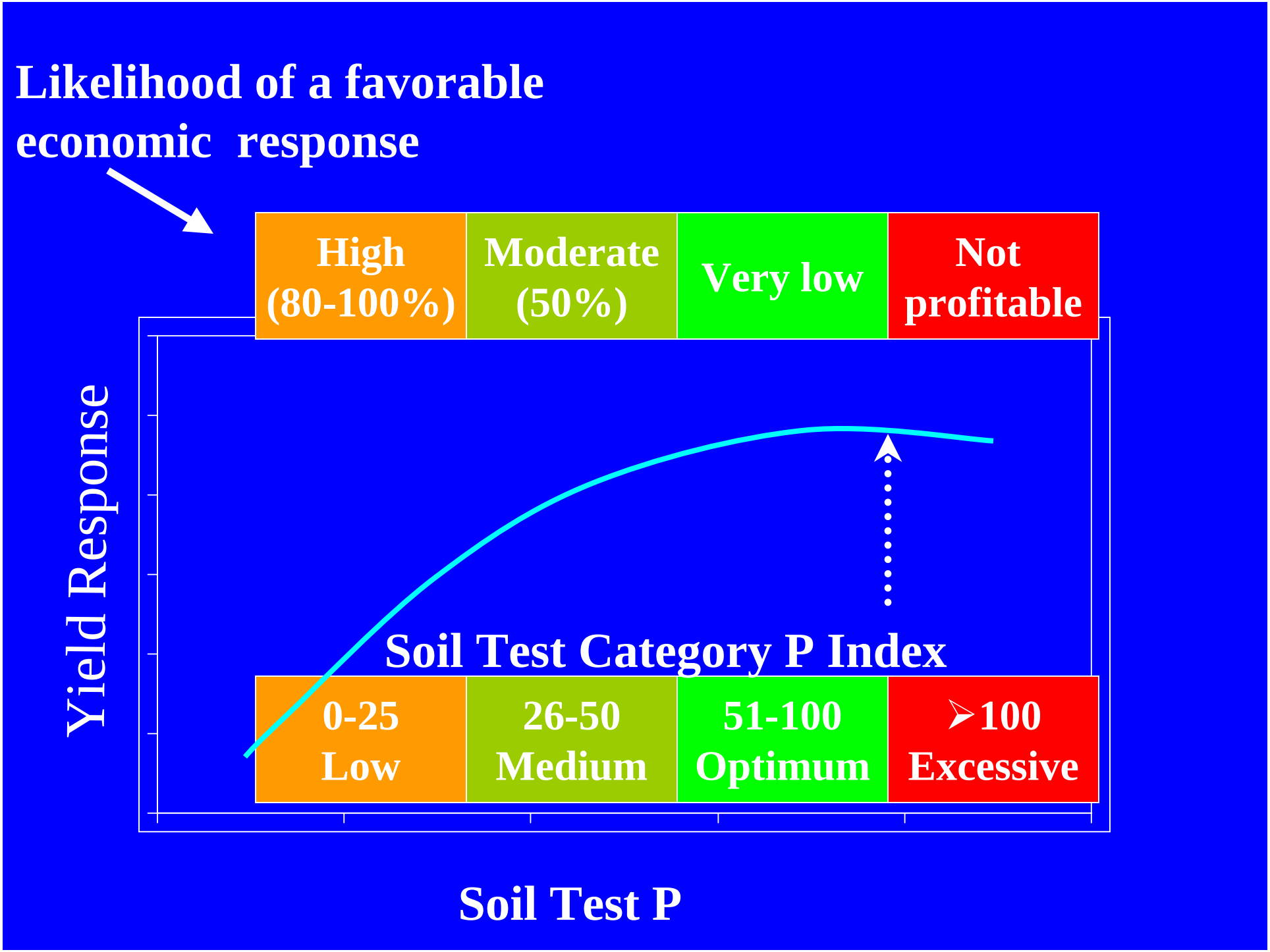
Summary

Tall Fescue seedling growth is not enhanced by the addition of P to soils having excessive soil test P when conditions favor rapid seedling growth.

Some enhancement of tall fescue seedling growth may occur in some soils having excessive soil test P when cold temperatures limit seedling growth.

Summary

Seedling responses to added P in soils having optimum soil test P indicate that these soils would be better described as having medium levels of P for the purpose of turfgrass establishment.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Summary

Surface placement of P to enhance tall fescue establishment is more important in soils having sub-optimal levels of P than in soils containing optimal levels of soil test P.

Summary

The results of this study may not be applicable to other turfgrass species

Tall Fescue

Kentucky bluegrass