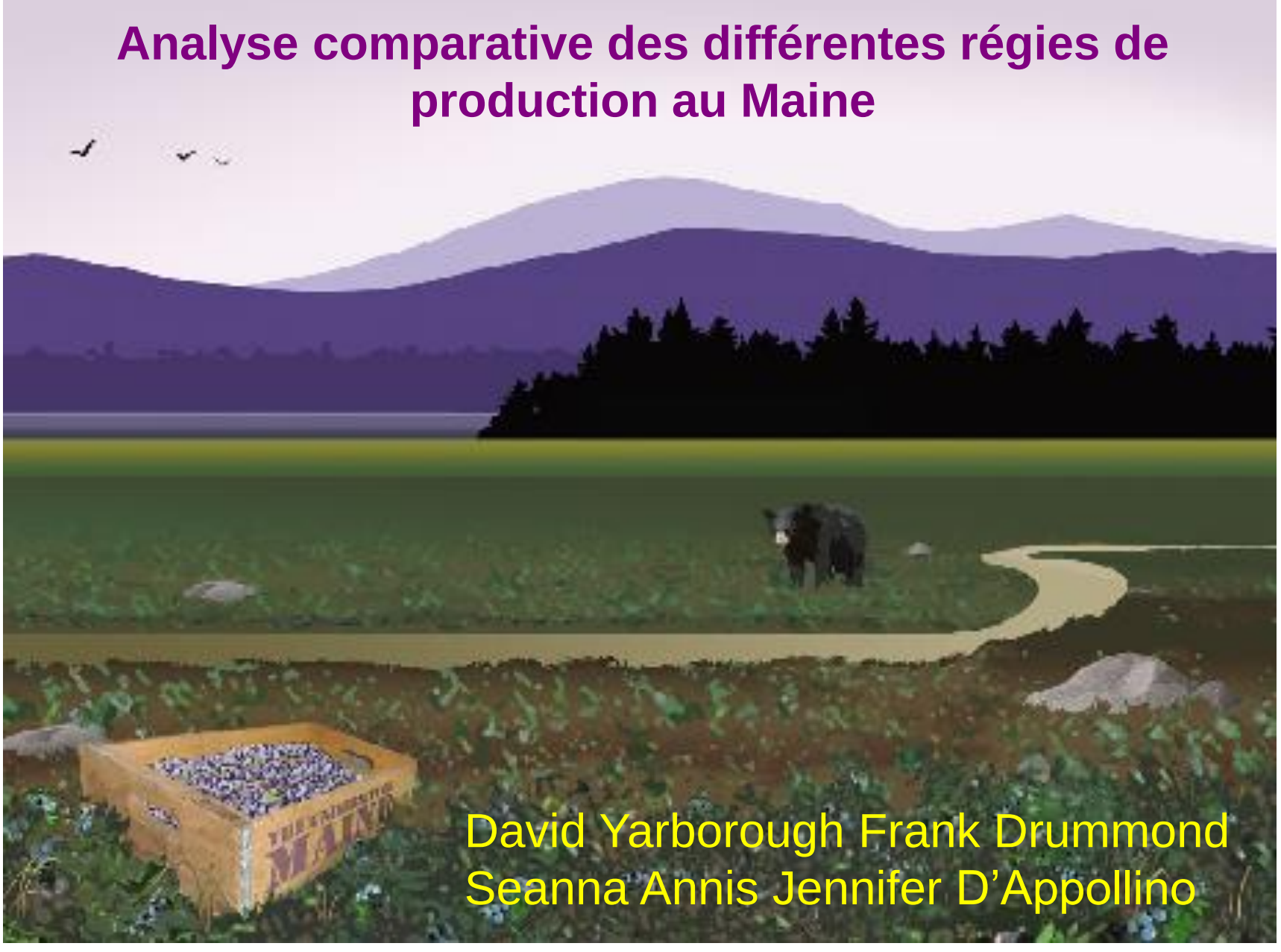
Analyse comparative des différentes régies de production au Maine



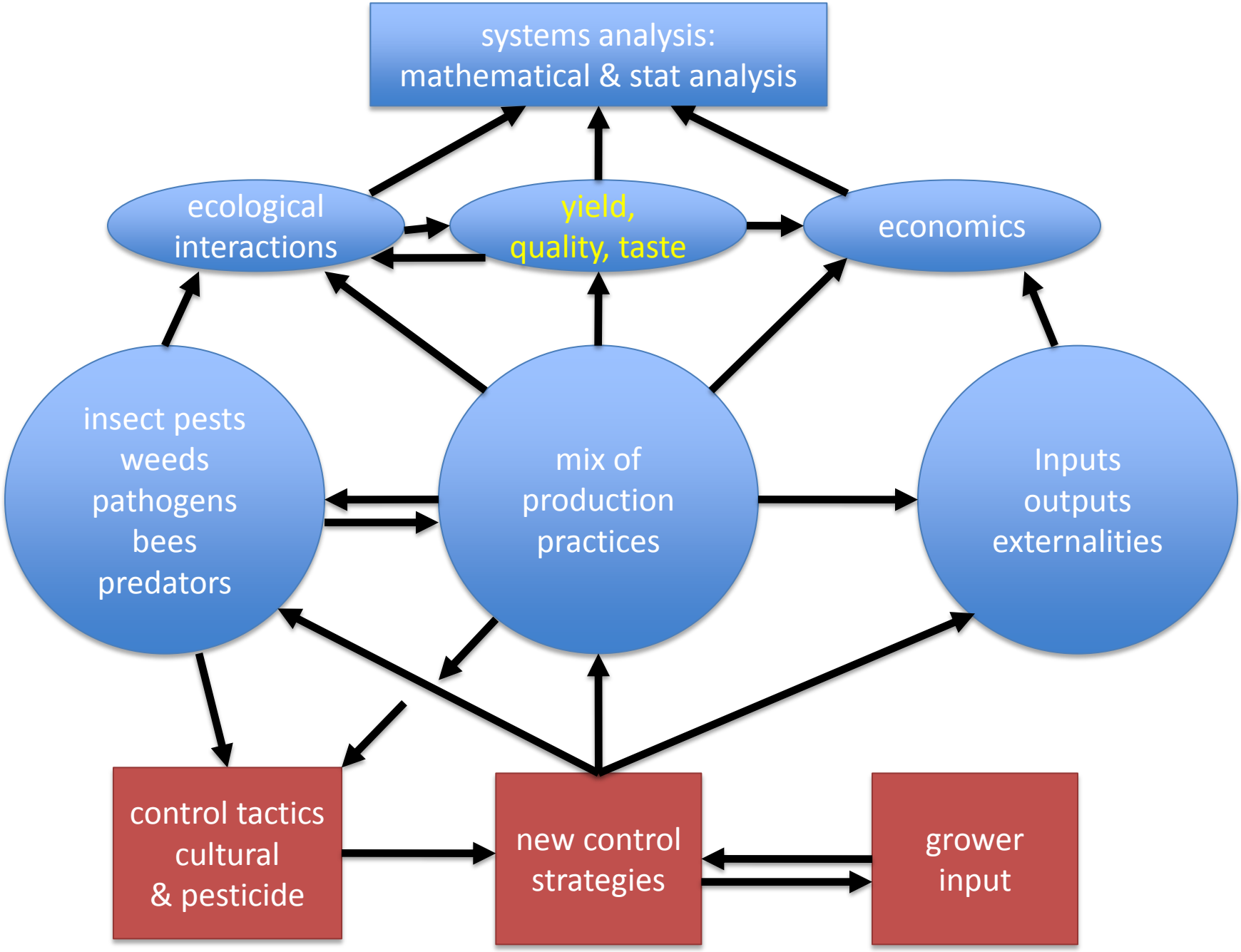
David Yarborough Frank Drummond
Seanna Annis Jennifer D'Appollino

Bleuet 2017 Dolbeau-Mistassini 15 Mars 2017

1865 THE UNIVERSITY OF MAINE
Cooperative Extension

Wild Blueberries – world wide

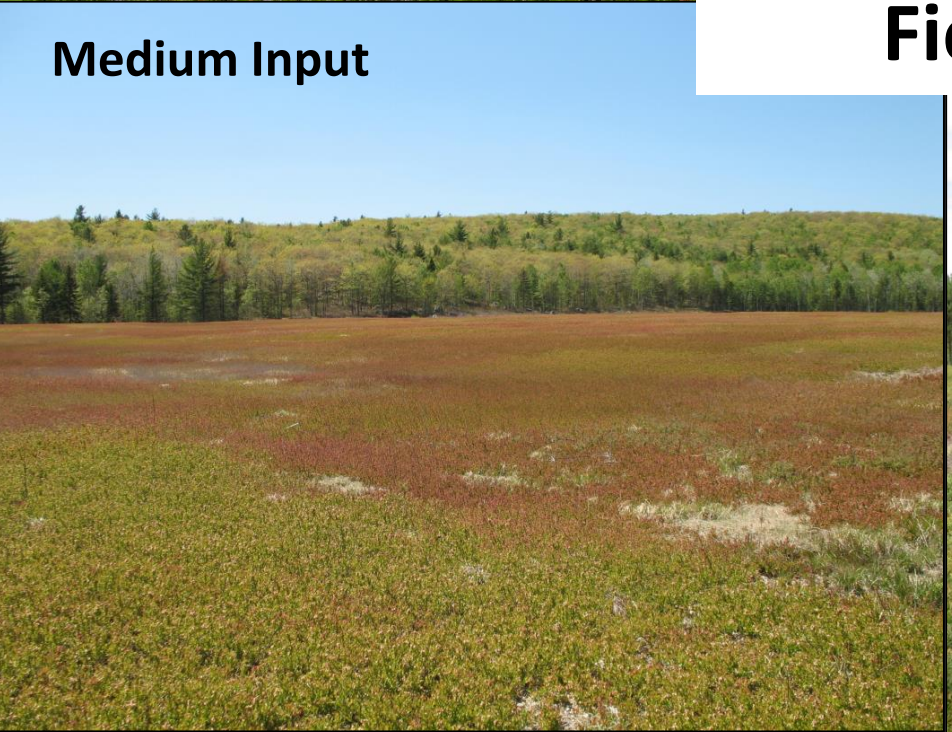
Wild production concentrated in Maine, Atlantic Canada and Quebec

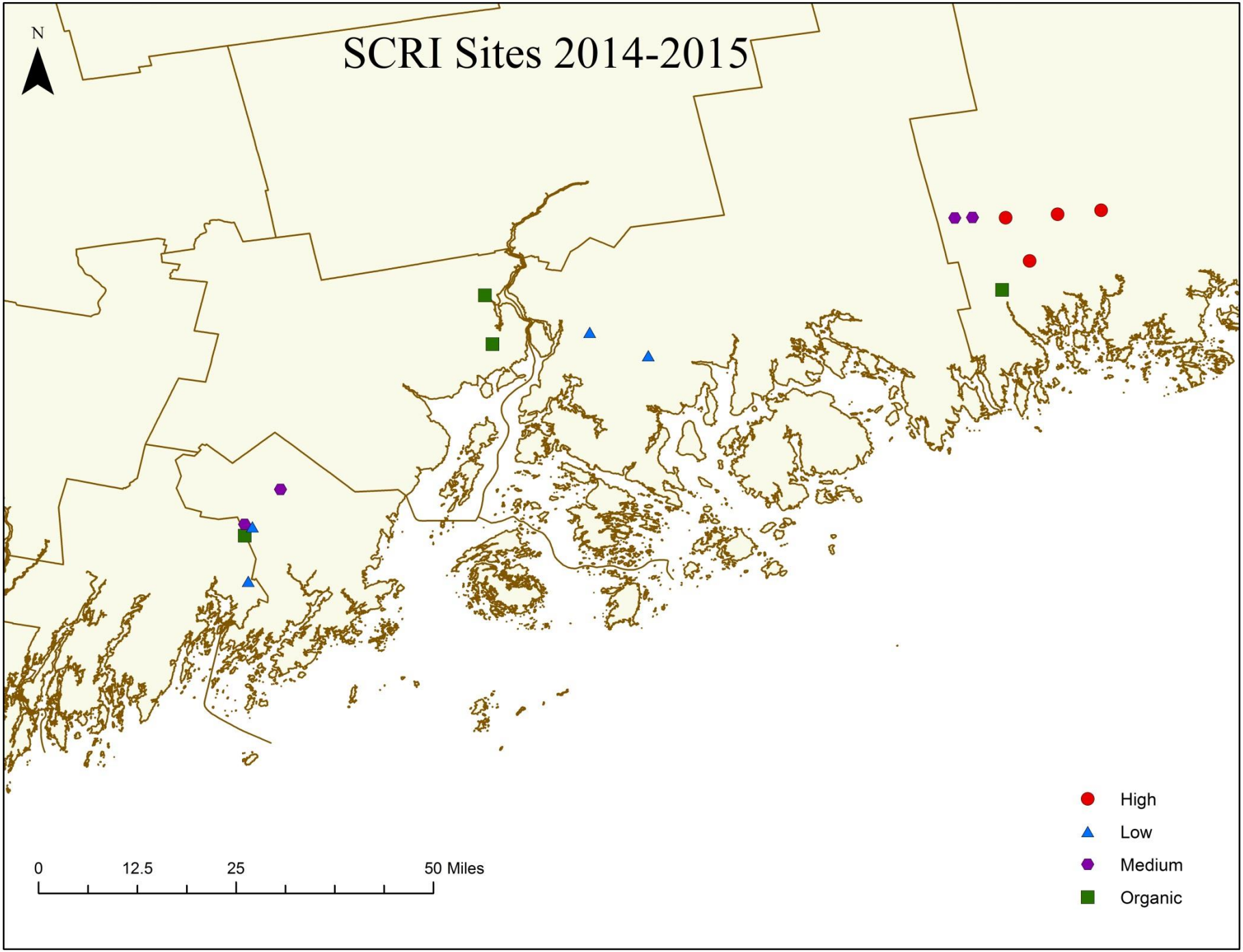

systems analysis:
mathematical & stat analysis
ecological
interactions
yield,
quality, taste
economics
insect pests
weeds
pathogens
bees
predators
mix of
production
practices
Inputs
outputs
externalities
control tactics
cultural
& pesticide
new control
strategies
grower
input

Methods - Systems input criteria

	Management input systems overview of inputs 2010 to 2015			
Production Factors	**Organic**	**Low Input**	**Medium Input**	**High Input**
Pruning	Burned	Burned	Mowed	Mowed
Land leveling	Not land leveled	Not land leveled	Land leveled	Land leveled
pH management	pH managed	No pH management	pH managed	pH managed
Fertility	No fertilizer	Some fertilizer	Fertility (both cycles)	Fertility rate much higher
Pest, disease, and weed control	Cutting woody weeds, grazing with goats, no pesticides used	Herbicides insecticides, some sites with fungicides	Scouting, herbicides, insecticides, fungicides crop year	Scouting, herbicides, insecticides, fungicides in both years
Treatment of bare spots	Mulch	No mulch	No mulch	Mulch
Irrigation	No irrigation	No irrigation	No irrigation	Irrigation as needed
Pollination	Bees 0 to 2 hives/acre	Bees 1-3 hives/acre	Bees 2 hives/acre	Bees 5-7 hives/acre
Harvest method	Hand raked	Hand raked	Mechanical Harvest	Mechanical Harvest

SCRI – 8 to 16 Fields




SCRI Sites 2014-2015
N
0
12.5
25
50 Miles
High
Low
Medium
Organic

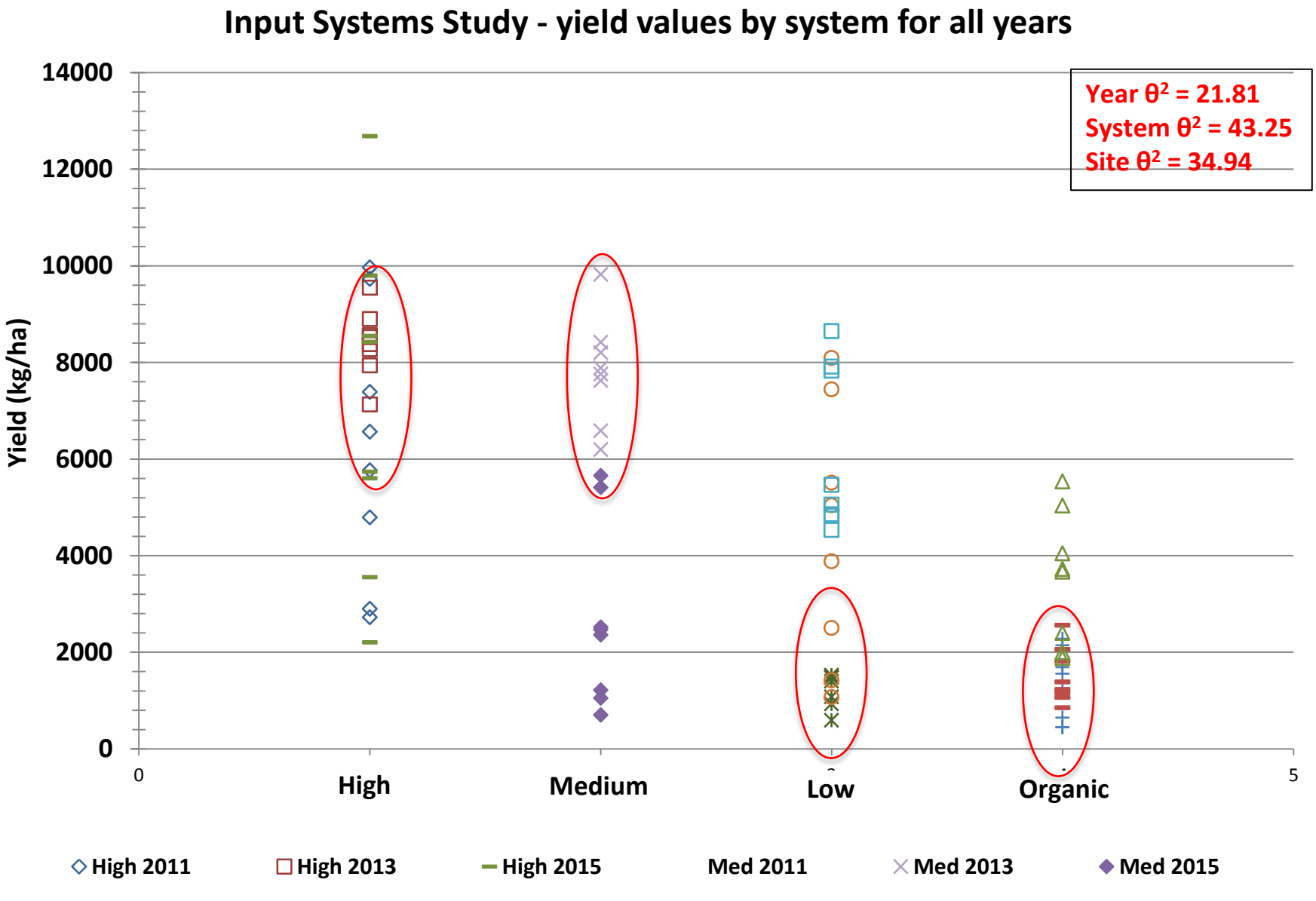
Methods

Structural equation modeling was used to produce a "path analysis" of the dynamics

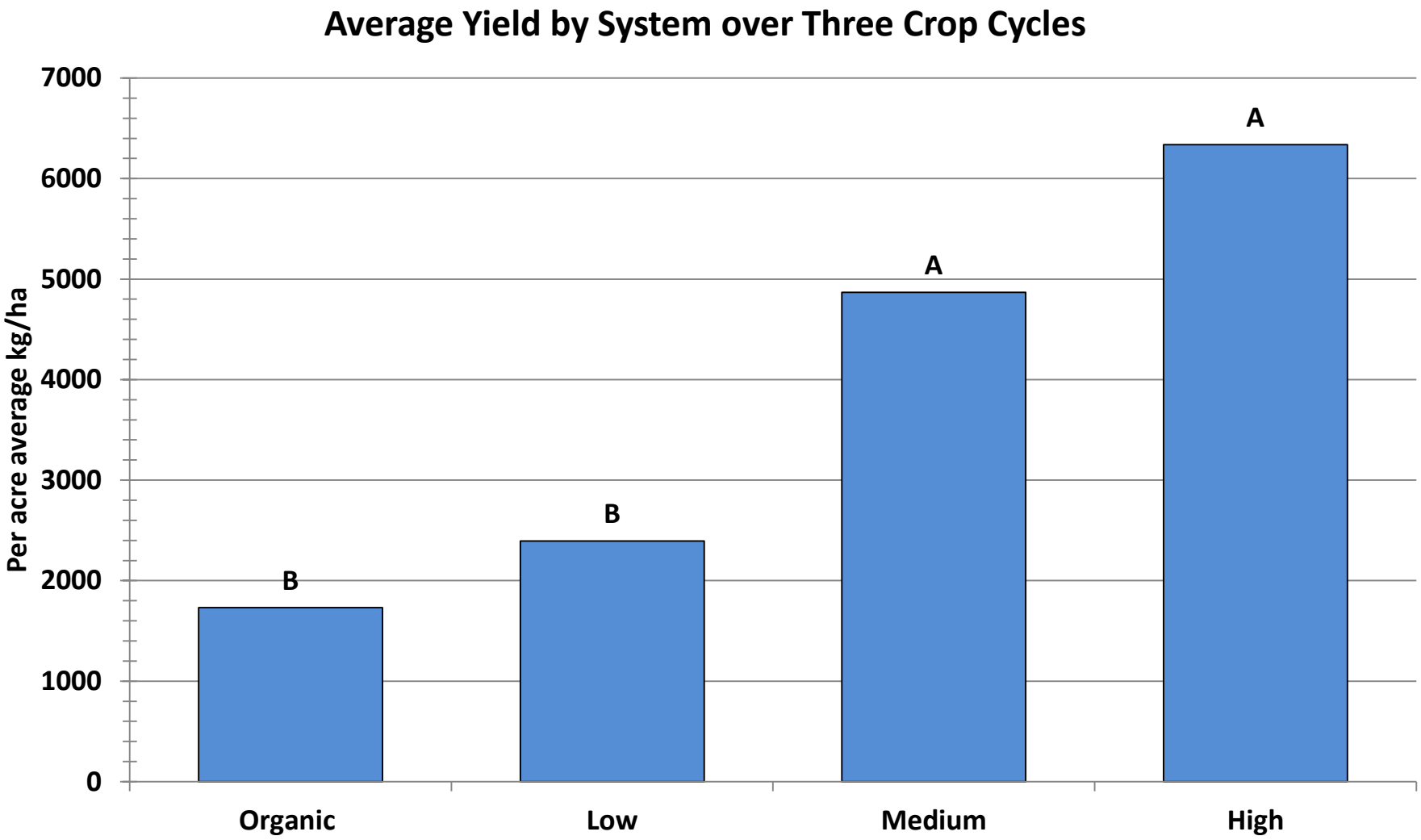
Initial hypothesized models were based upon our expert opinions and previous observations

Relationships are described by standardized *Beta* or correlation coefficients with the following symbols: †, *, **, and * representing P value intervals of: ≤ 0.10, ≤ 0.05, ≤ 0.01, ≤ 0.001**

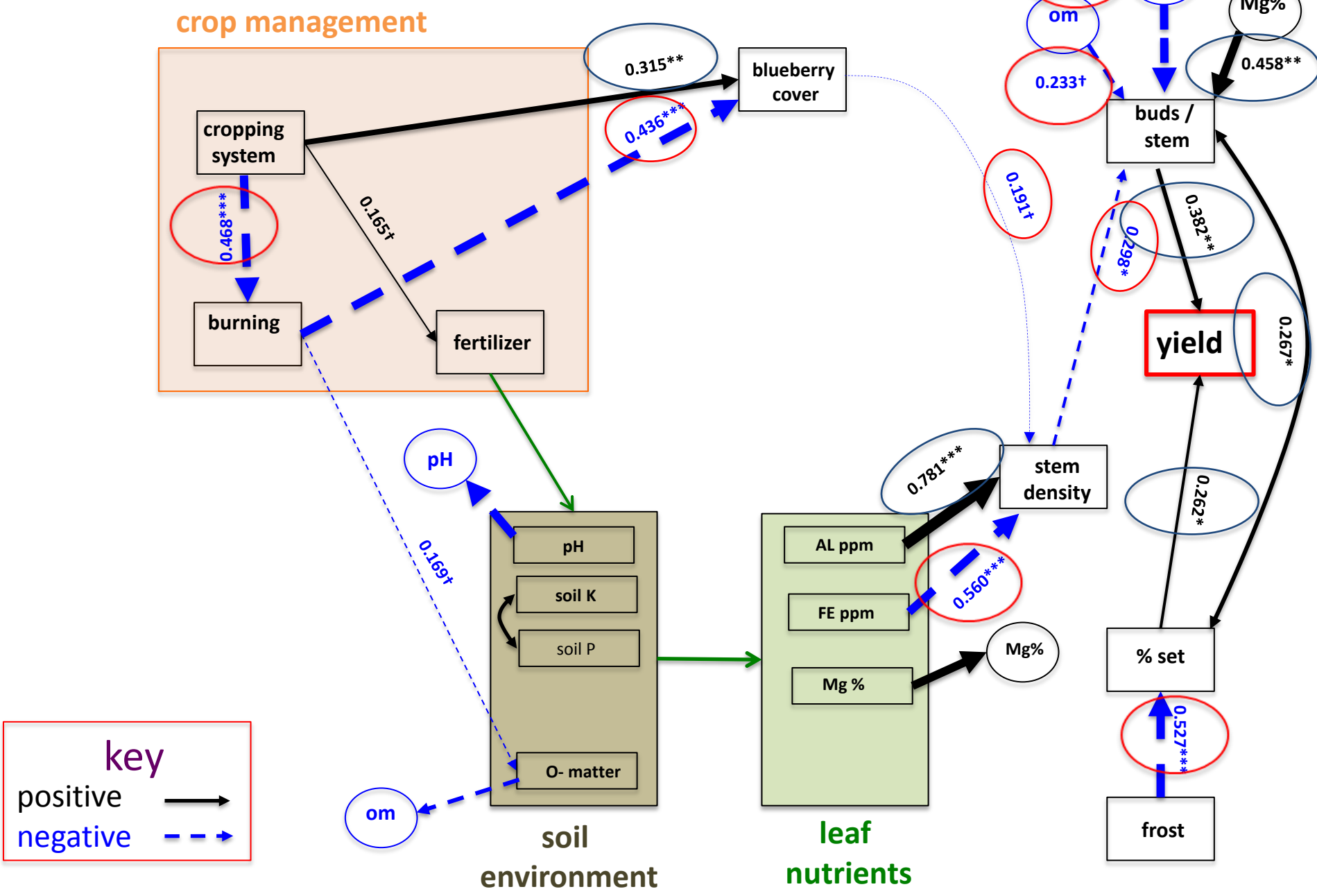
Results


Input Systems Study - yield values by system for all years
Year θ² = 21.81
System θ² = 43.25
Site θ² = 34.94
Yield (kg/ha)
14000
12000
10000
8000
6000
4000
2000
0
0
High
Medium
Low
Organic
5
High 2011
High 2013
High 2015
Med 2011
Med 2013
Med 2015

Results

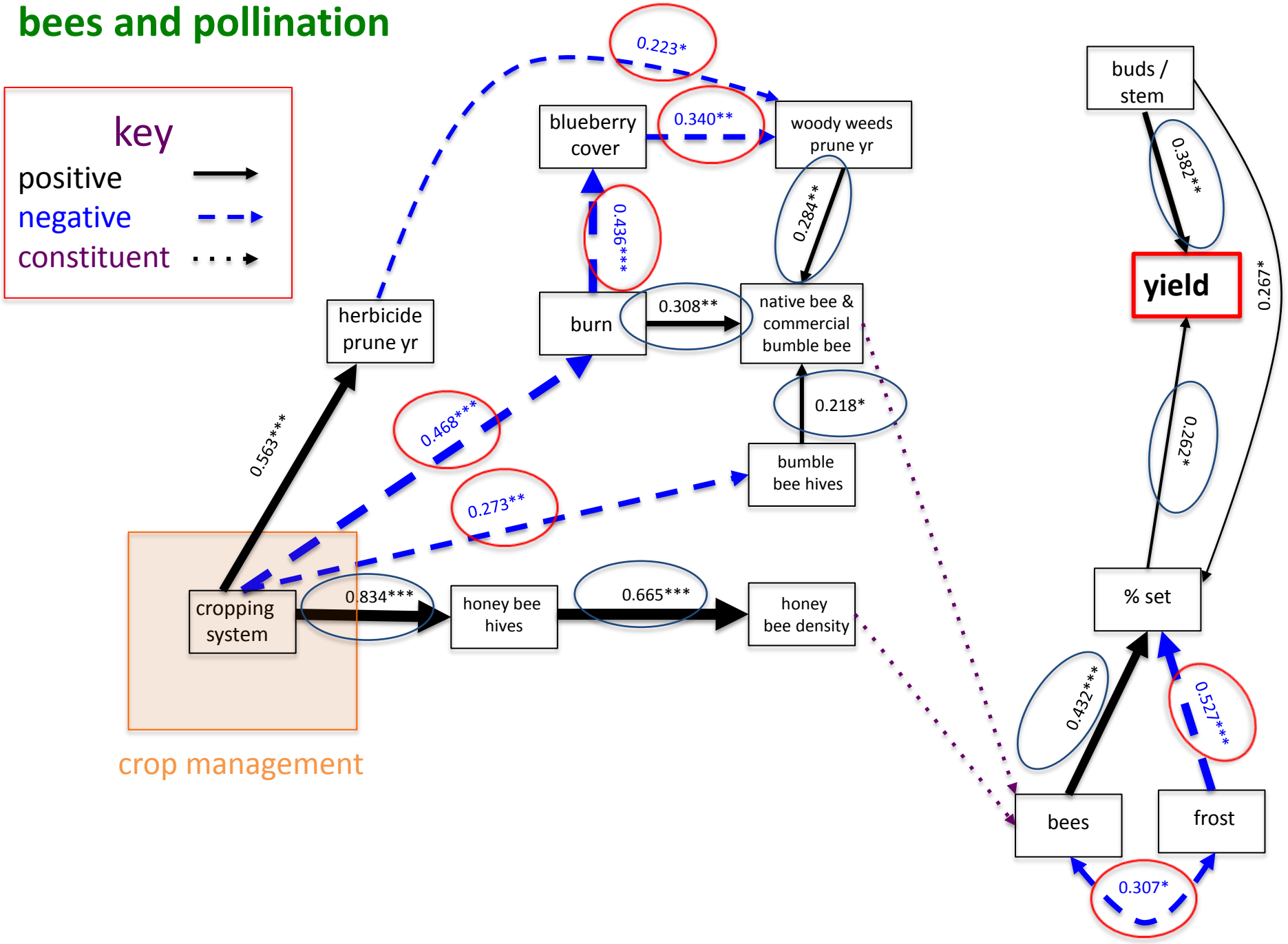

Average Yield by System over Three Crop Cycles
Per acre average kg/ha
7000
6000
5000
4000
3000
2000
1000
0
B
B
A
A
Organic
Low
Medium
High

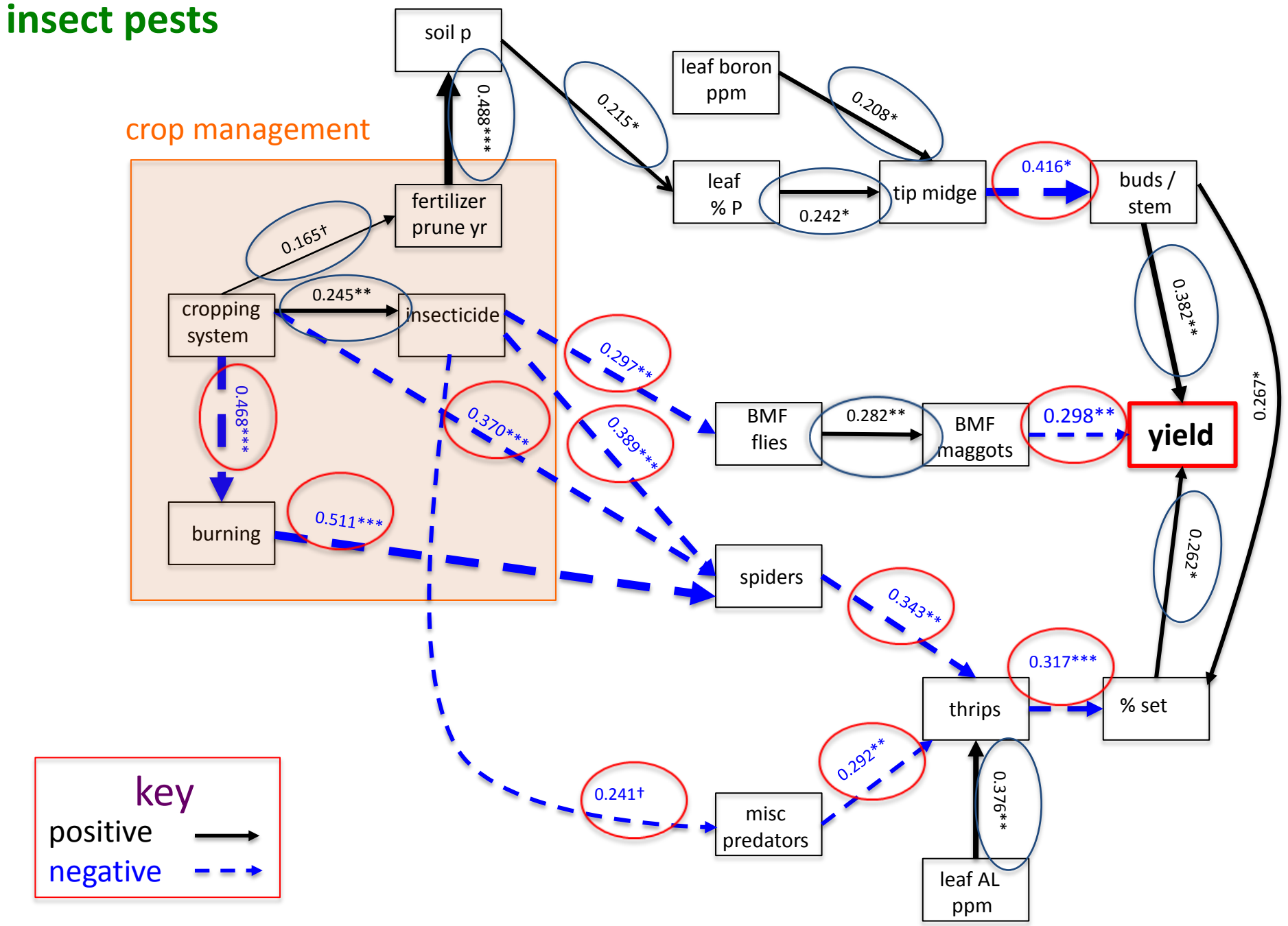
Crop Inputs

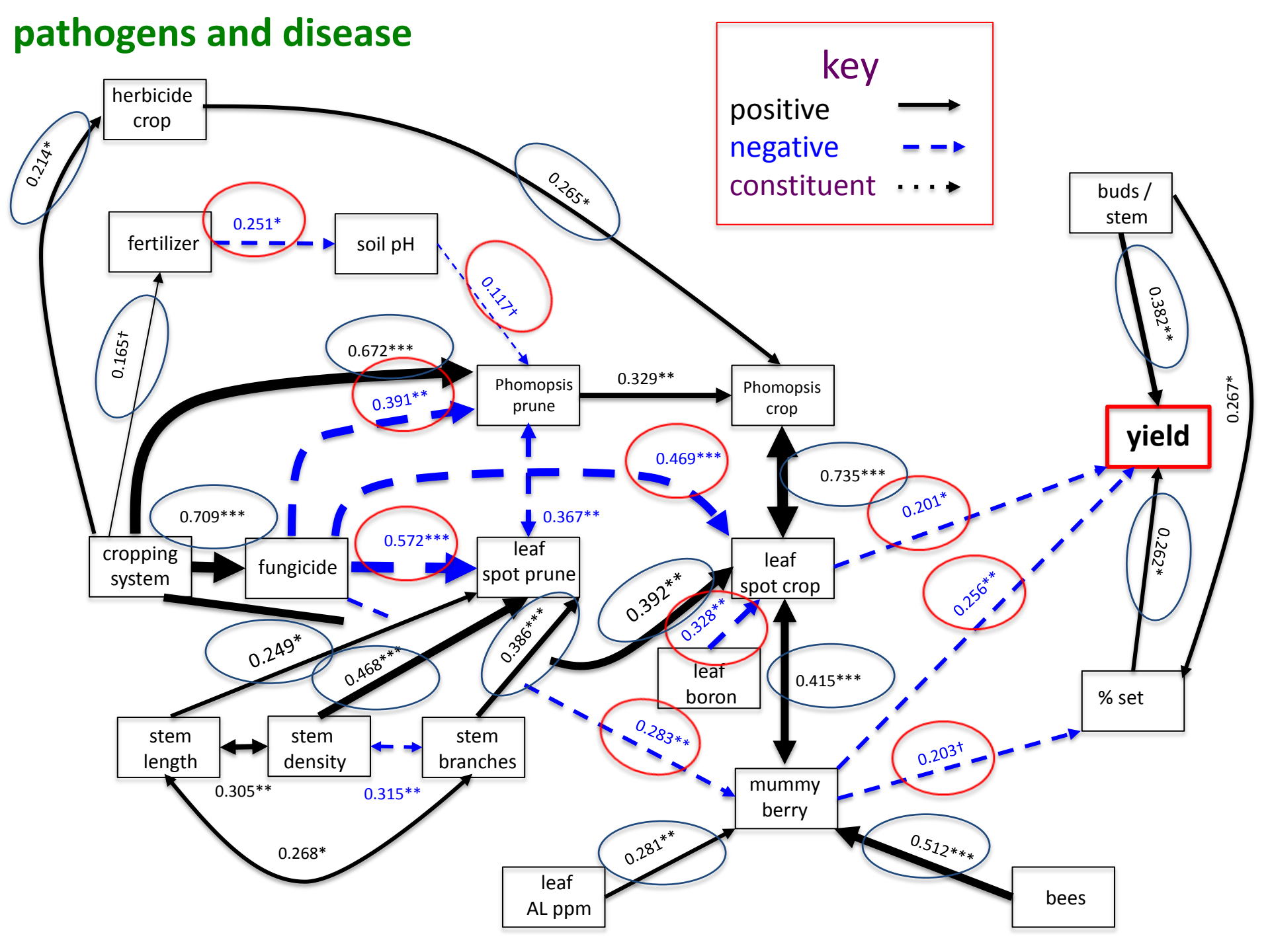


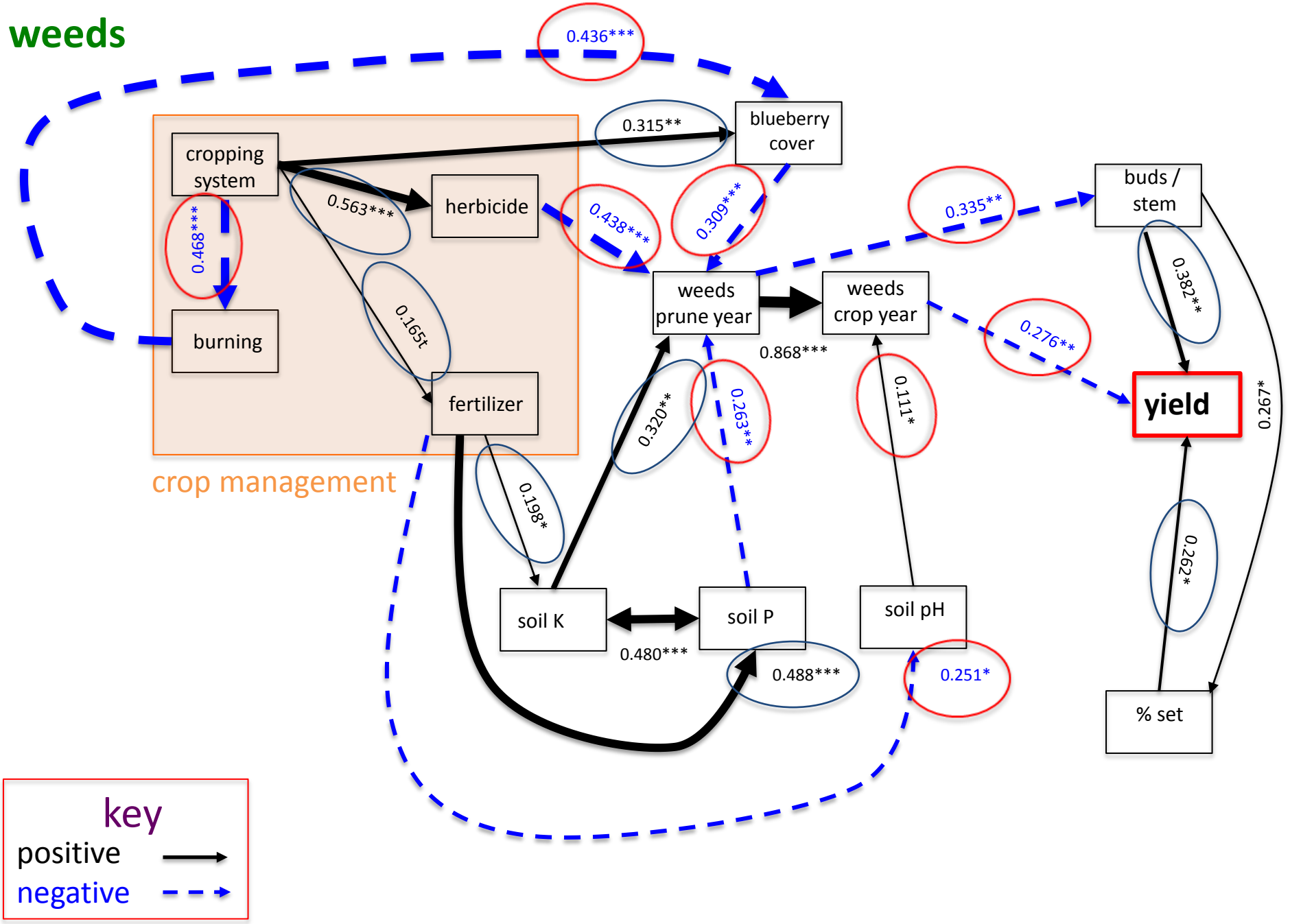
crop management
cropping system
burning
fertilizer
blueberry cover
0.315**
0.436***
0.468***
0.165†
0.191†
0.506***
pH
om
Mg%
0.233†
0.458**
buds / stem
0.382**
0.298*
yield
0.267*
0.262*
stem density
0.781***
0.560***
pH
0.169†
pH
soil K
soil P
O- matter
om
AL ppm
FE ppm
Mg %
Mg%
% set
0.527***
frost
soil environment
leaf nutrients
key
positive
negative

bees and pollination

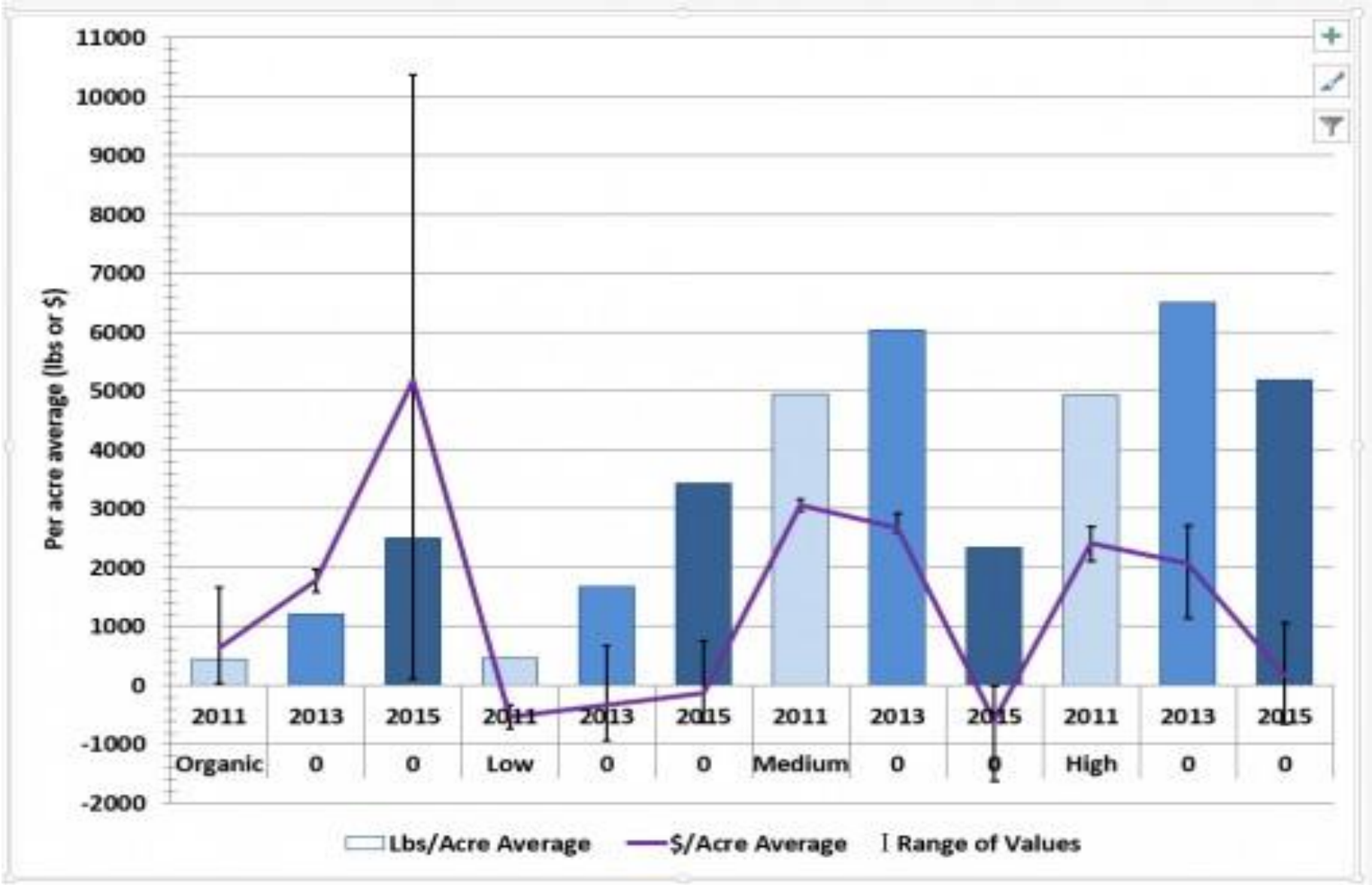


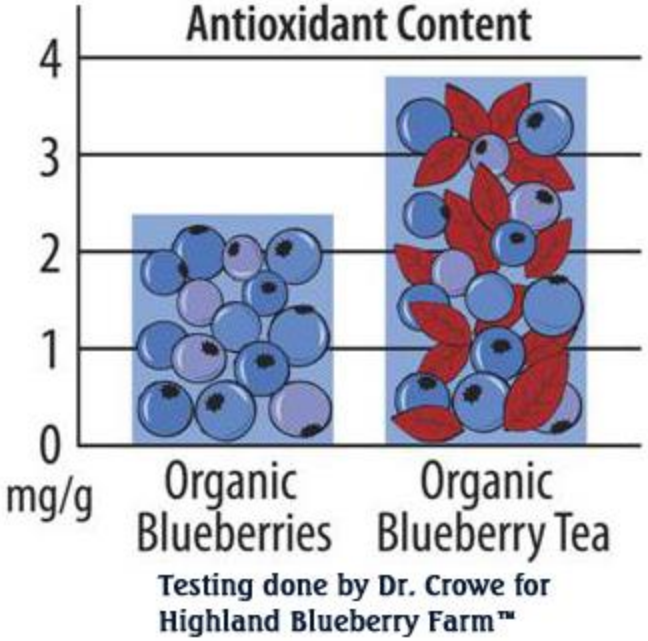

insect pests
crop management
soil p
leaf boron ppm
0.488***
0.215*
0.208*
fertilizer prune yr
leaf % P
0.242*
tip midge
0.416*
buds / stem
0.165†
cropping system
0.245**
insecticide
0.382**
0.267*
0.468***
0.297**
0.370***
0.389***
BMF flies
0.282**
BMF maggots
0.298**
yield
burning
0.511***
spiders
0.343**
0.262*
0.317***
thrips
% set
0.241†
misc predators
0.292**
0.376**
leaf AL ppm
key
positive
negative


pathogens and disease
key
positive
negative
constituent
herbicide crop
fertilizer
soil pH
buds / stem
yield
Phomopsis prune
Phomopsis crop
cropping system
fungicide
leaf spot prune
leaf spot crop
leaf boron
% set
stem length
stem density
stem branches
mummy berry
leaf AL ppm
bees
0.214*
0.265*
0.251*
0.117†
0.165†
0.672***
0.391**
0.329**
0.382**
0.267*
0.469***
0.735***
0.709***
0.367**
0.201*
0.572***
0.392**
0.328**
0.256**
0.262*
0.249*
0.468***
0.386***
0.415***
0.283**
0.203†
0.305**
0.315**
0.268*
0.281**
0.512***


weeds
0.436***
cropping system
0.315**
blueberry cover
0.563***
herbicide
0.438***
0.309***
0.335**
buds / stem
0.468***
0.382**
burning
0.165t
weeds prune year
weeds crop year
0.868***
0.276**
yield
0.267*
fertilizer
0.320**
0.263**
0.111*
crop management
0.198*
soil K
soil P
soil pH
0.480***
0.488***
0.251*
0.262*
% set
key
positive
negative

Yield and Profitability from Systems Study





Testing done by Dr. Crowe for Highland Blueberry Farm™

www.organicblueberrytea.com

Conclusion

System management accounted for the greatest variation followed by site and year

Yield for High vs Medium and Low vs Organic system not significantly different but the two groups were significantly different

Key negative factors

Burning for pruning reduced plant stand and yield and Frost major limiting factor to yield

Burning and insecticides decreased beneficial insects but insecticides reduced yield losses

Mummy berry and leaf diseases reduced yield, and bees increased mummy berry

Higher levels of management increased disease and required more fungicides

Al increased stem density and mummy berry

Conclusion

Key positive factors

Number of buds per stem and fruit set were consistently correlated with higher yield

Higher inputs of pollinators major factor in improving yield

Improving plant health with fertilizer and lowering soil pH with sulfur and along with higher organic matter improved yield and leaf B reduced leaf spot

Protecting losses from weeds, insects and disease improved yield

Conclusion

Yield and Profitability

While the organic input production system had low yields, the higher value of the organic fruit and the fresh sales and value added products produced the greatest overall average profit on small scale farms

The medium input system produced the next highest profit a while the high input system was third in profitability

The risk simulation indicated that overall all systems could be profitable but the higher inputs resulted in reduced risk of not being profitable.

Questions?