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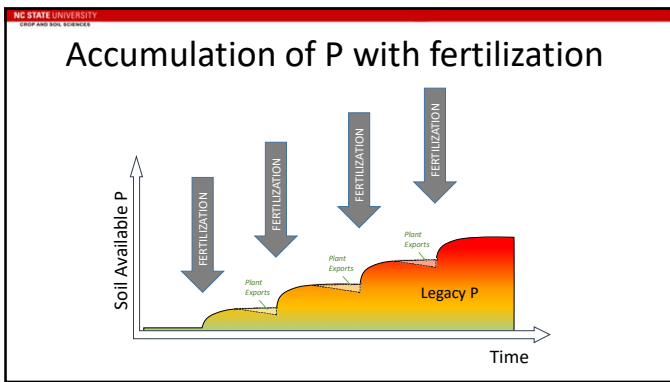
Drawdown of Soil Legacy Phosphorus

A meta-analysis

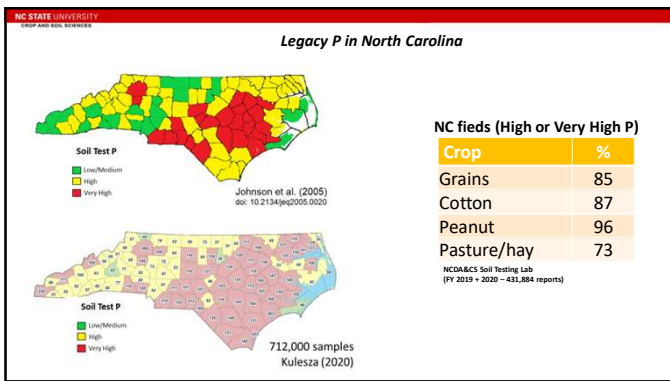
Gatiboni, L.; Shober, A.; Fiorellino, N.; Osmond, D.; Mosesso, L.

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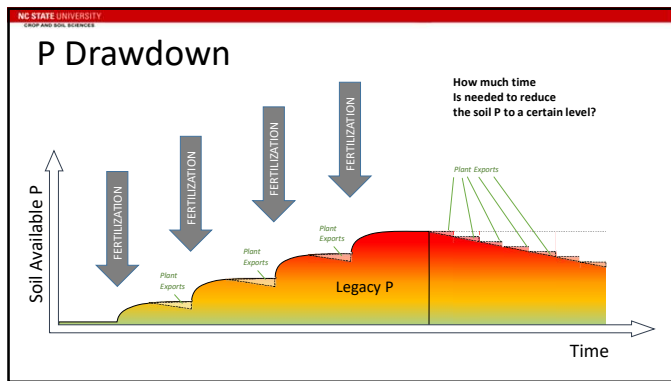
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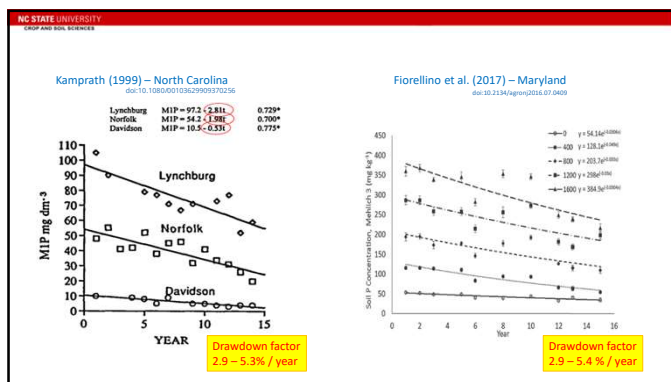
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Motivation for our Study:

- Similar pattern of P drawdown in different studies

Objective:

- Determine the **average yearly reduction** in available P when fertilization is stopped
- Determine **factors affecting** the P drawdown rate

Preselected criteria to include papers in this Meta-analysis

- Papers with at least one treatment with **Phosphorus drawdown** (plant growth without P application)
- Drawdown treatment contains soil P data **before and after** at least **4 years** of drawdown
- Soil analysis by one of these 4 methods: **Mehlich-1, Mehlich-3, Bray, or Olsen**

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Systematic Review

27 publications
- included P drawdown curves

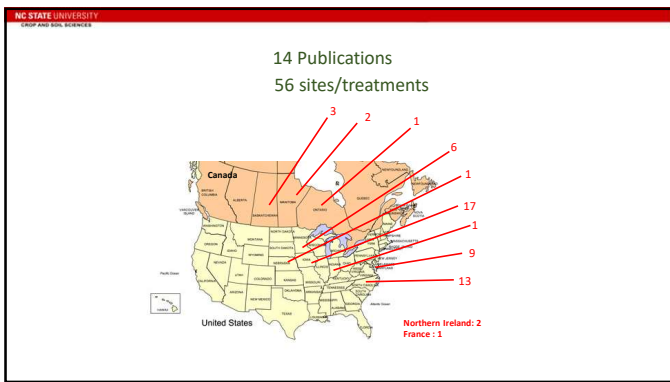
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14 publications
- at least a 4-years interval
- Mehlich-1, Mehlich-3, Bray, Olsen

↳ 56 drawdown sites/treatments



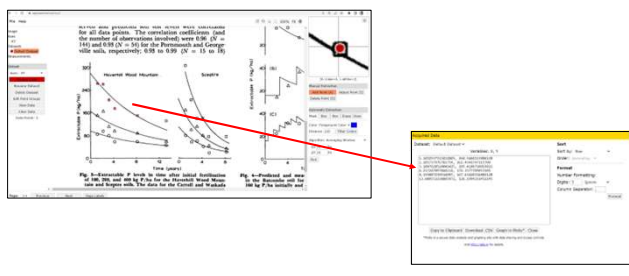
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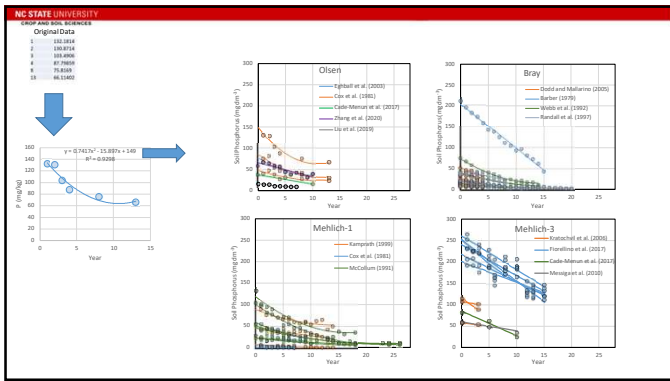
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Data Extraction

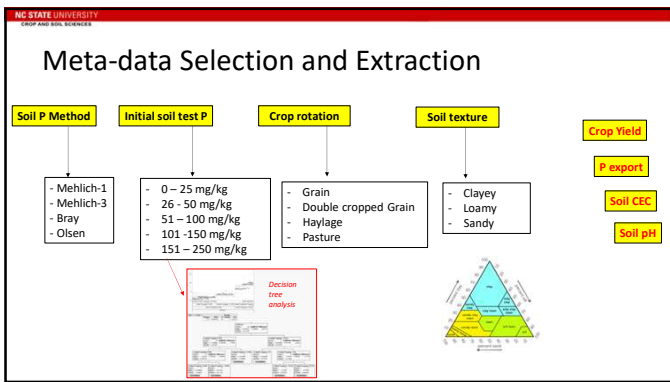


WebPlotDigitizer

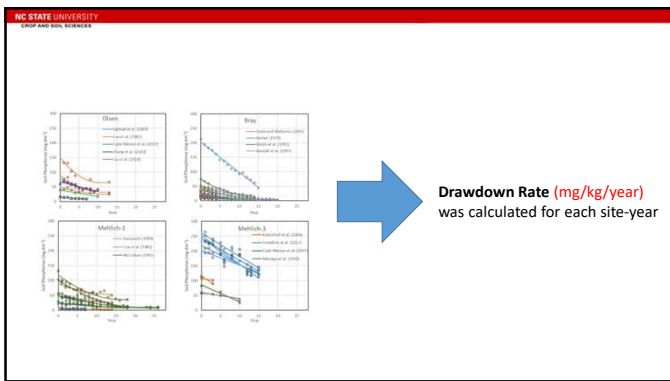
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What factor is the most important for the Drawdown Rate?

- Initial P availability
- P method
- Crop rotation
- Soil Texture

Statistical approach:
Bootstrap Forest of Decision trees
(1,000 trees for each year)

	$\Delta 1$	$\Delta 2$	$\Delta 3$	$\Delta 4$	$\Delta 5$	$\Delta 6$	$\Delta 7$	$\Delta 8$	$\Delta 9$	$\Delta 10$	Average 10yr
Initial P	0.8383	0.8338	0.8497	0.8728	0.8824	0.8953	0.8996	0.8927	0.7944	0.7098	0.83938
P method	0.0901	0.076	0.0784	0.0868	0.0847	0.1067	0.1145	0.1426	0.1722	0.205	0.1157
Crop	0.0607	0.0564	0.0589	0.0305	0.0249	0.0258	0.0193	0.0226	0.0201	0.0186	0.03378
Texture	0.0129	0.0159	0.0129	0.0099	0.0081	0.0081	0.0056	0.0081	0.0133	0.0166	0.01124
Residue	0.724	0.747	0.765	0.846	0.856	0.864	0.859	0.881	0.826	0.8	0.7648

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Procedure for the meta-analysis:

Bootstrapping in each year
separated by Initial P availability

- 5 classes of Initial P availability
- 5,000 resampling for each year
- calculate Confidence Intervals

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Results

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