FIBER & BIOPOLYMER RESEARCH INSTITUTE

TEXAS TECH
Davis College

2024 WTACI ANNUAL CONFERENCE

Assessment of residual herbicides under conventional and conservation land management practices

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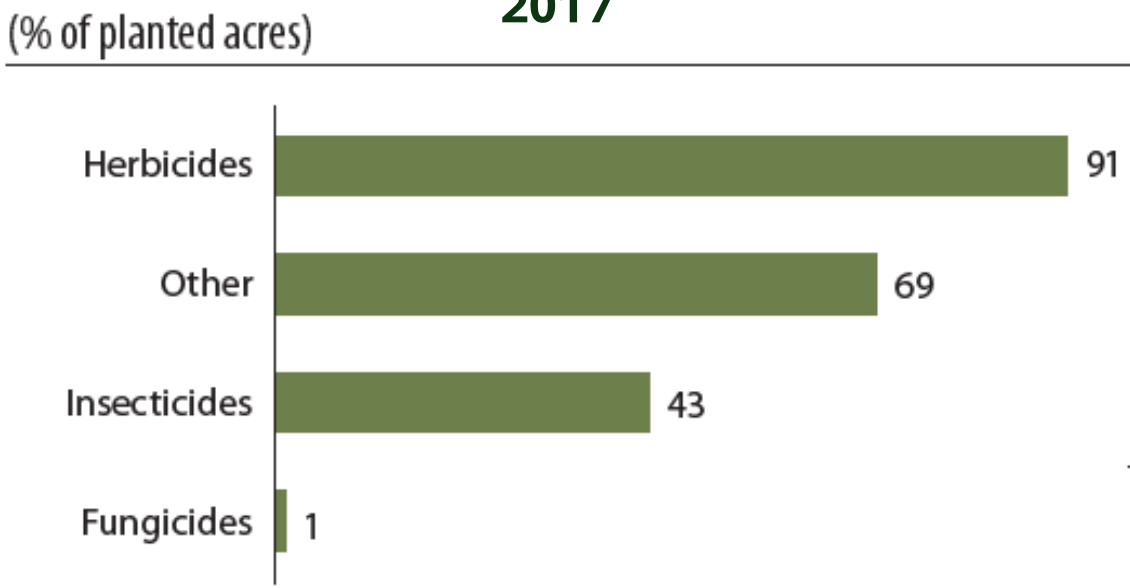
PIs: Drs. Kalavathy Rajan, Joseph Burke & Katie Lewis

Significance Herbicides are used most extensively, applied to 91% of cotton planted acres.

Pesticides applied to cotton planted acres, 2017

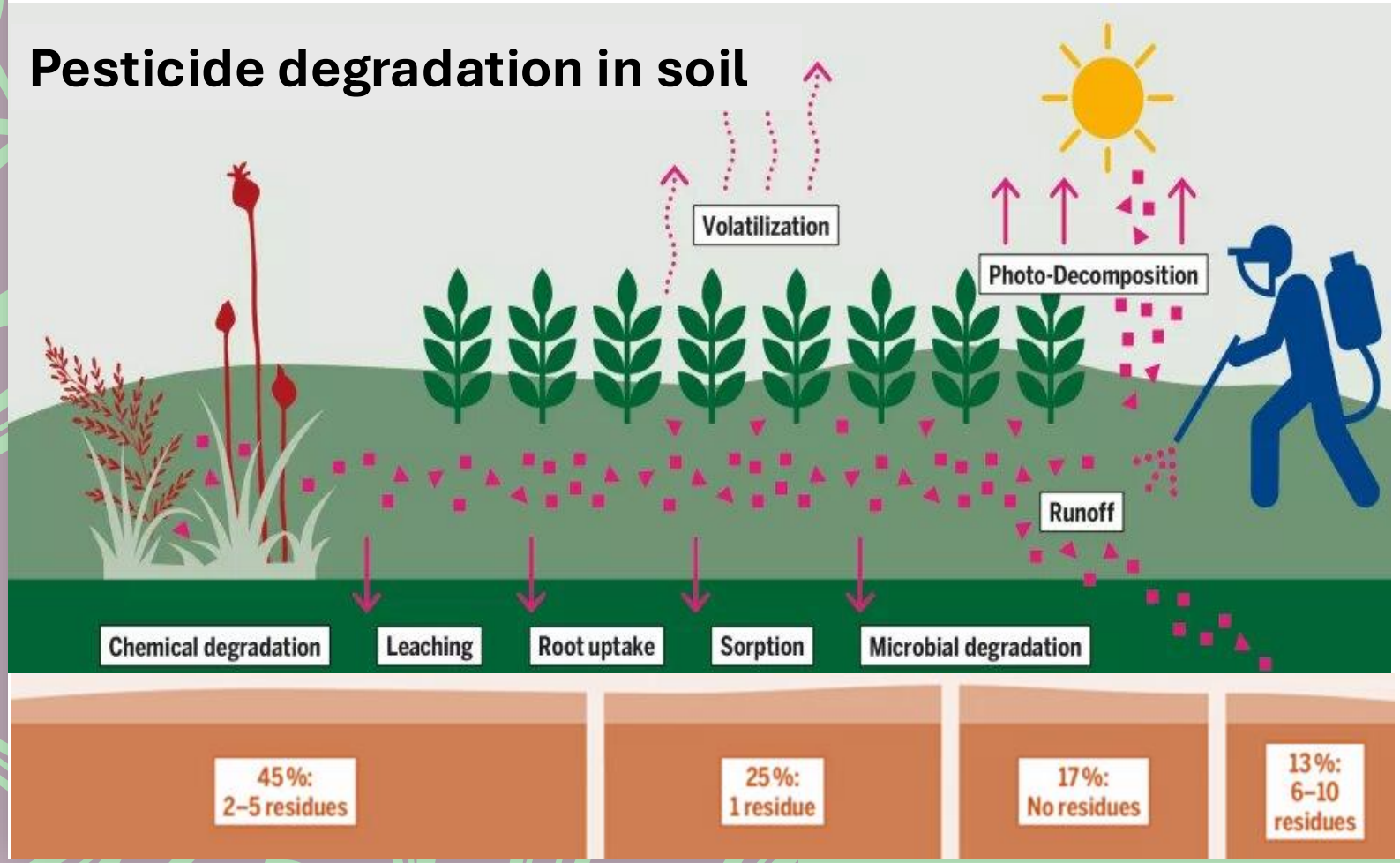


Top herbicides applied to cotton planted acres, 2017

Active Ingredient	% of Planted Acres	Avg. Rate for Year (lbs/acre)	Total Applied (mil lbs)
Glyphosate isopropylamine salt	59	1.494[a]	10.0[a]
Trifluralin	23	0.885	2.3
Diuron	23	0.417	1.1
Glyphosate potassium salt	18	2.068[a]	4.1[a]
Glufosinate-ammonium	17	0.592	1.2

[a] *Expressed in acid equivalent.*

Significance Pesticides accumulating in soil exert direct and indirect adverse effects on soil life – sometimes for decades.



https://eu.boell.org/en/PesticideAtlas-soils

- ❑ Disruptions to earthworm ecology
- ❑ Inhibition of soil N-cycling
- ❑ Site-specific increases in disease
- ❑ Off-target movement (*2,4-D, dicamba, aminopyralid, picloram*) can be detrimental to cotton plants.
- ❑ Soil persistence (*trifluralin*) could be toxic to sequentially planted cover crops and nitrogen-fixers.

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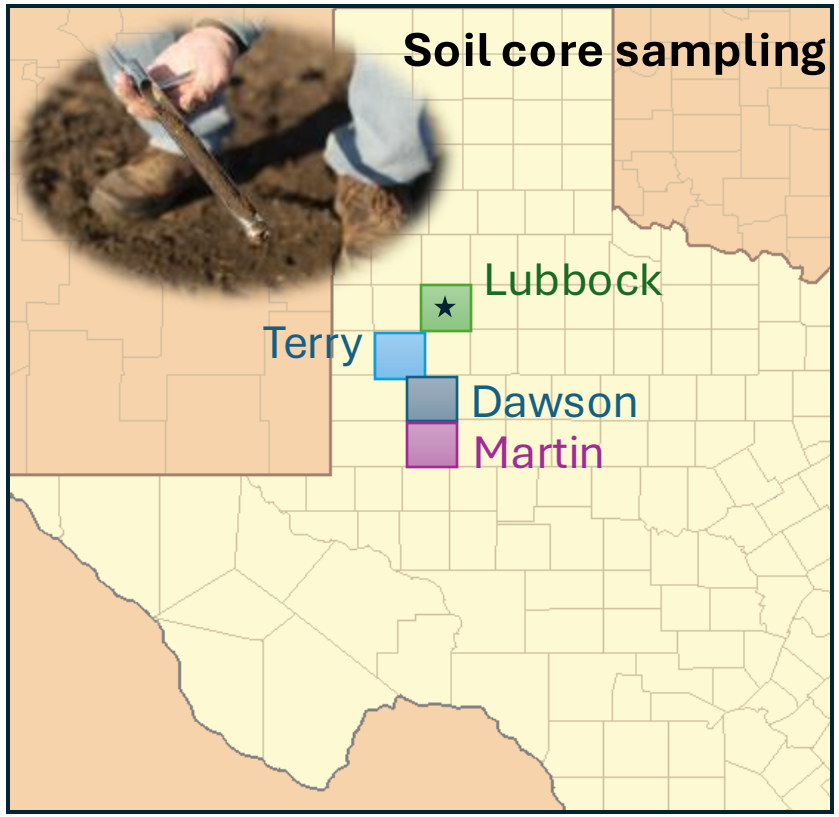
Scope & objectives Herbicide persistence in soil ≤4 months after application

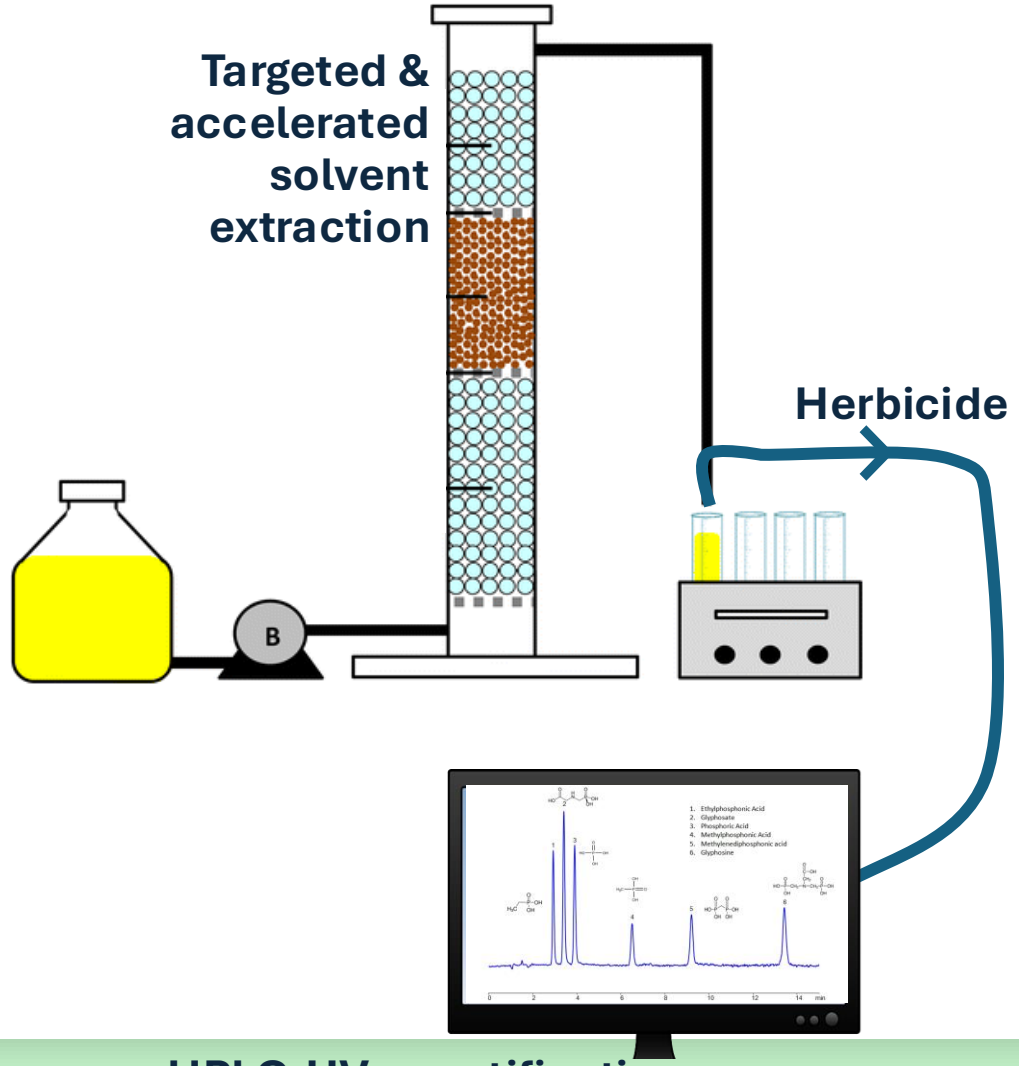


108 samples collected during February to May, in 2023 and 2024, following the application of herbicides for "burning down" the weeds

Conventional land management

Conservation land management

Targeted & accelerated solvent extraction



HPLC-UV quantification

Drs. Joseph BURKE, Katie LEWIS

THANK YOU