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WINTER CROPS RESIDUES DECOMPOSITION IN NO-TILLAGE SYSTEM IN SAVANNAH CLIMATE

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INTRODUCTION

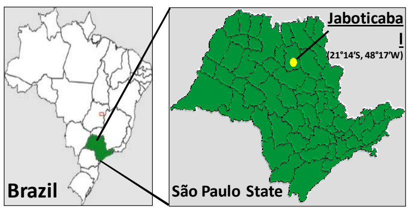
In no-tillage system, plant residues are expected to maintain the soil covered for long periods of time in order to control soil erosion. Therefore, the dynamic of plant residues decomposition can be different according to the species. The study of residue decomposition under field conditions is a requirement for optimizing the crop options rotation in no-tillage systems.

OBJECTIVE:

The purpose of this study was to evaluate the plant residue decomposition over time of winter crops in no-tillage system in Savannah climate.

MATERIAL AND METHODS

Location: Jaboticabal, Sao Paulo State, Brazil (21°14'S, 48°17'W, altitude 615 m).



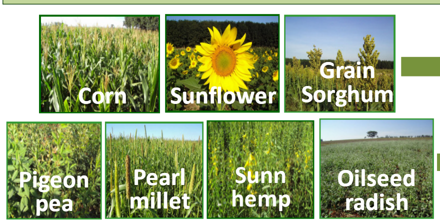
Climatology: Tropical/Megathermal zone or Köppen's Aw Savannah Climate;
Mean annual rainfall: 1,417 mm, with the highest concentration during October to March.

Soil: Rhodic Eutrudox, under no-tillage system.

Experiment establishment: October, 2002.

Experimental design: Block design, with 3 replications.

Winter Crops (February-March, 2009)



Evaluations:

Dry matter winter crops production;

Residues decomposition;

Periods of time:

0, 15, 30, 60, 120 and 180 days.

Data adjustment:

Exponential model ($Y = 100.e^{-kt}$).
Y = plant residue dry mass;
k = decomposition constant rate;
t = time (days).

RESULTS

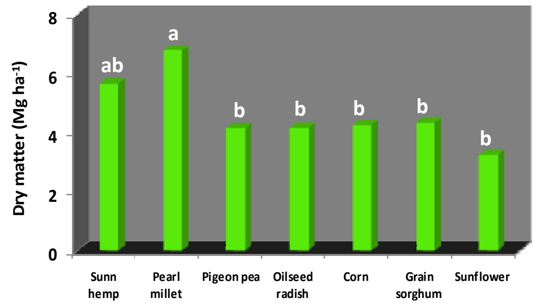


Figure 1. Winter crops dry matter production.
Columns with the same letter are not significantly different by the Tukey test (p<0.05).

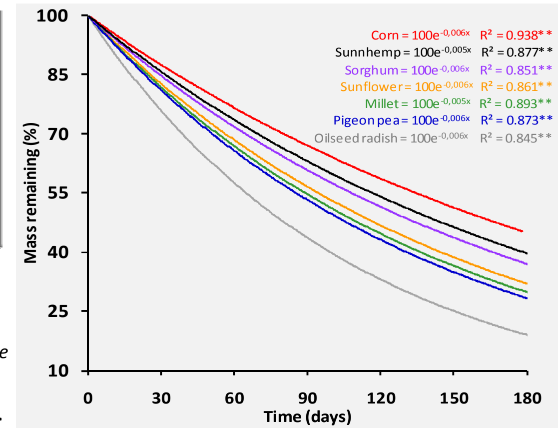
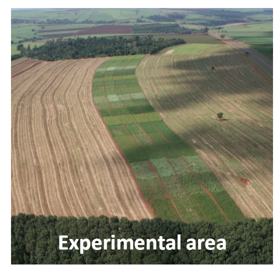


Figure 2. Mass loss from winter crops residues over time. *** = significantly (p<0.01).*

Table 1. Winter crops residues C:N ratio, half-life periods and mass loss until half-life period.

Winter crops	C:N Ratio	Half-life period	Mass loss [1]
	-	(days)	(Mg ha⁻¹)
Sunnhemp	23	135	2.83
Millet	31	103	3.39
Pigeon pea	20	99	2.07
Oilseed radish	32	75	2.08
Corn	110	156	2.13
Grain sorghum	102	126	2,16
Sunflower	84	110	1.63

[1] Degradation until half-life period.



CONCLUSION:

- Oilseed radish residues showed the fastest decomposition rate, losing 50% of their dry mass within 75 days.
- High resistance for decomposition was observed in corn, sunn hemp and sorghum residues, which reduced 50% of their dry mass within 156, 135 and 126 days, respectively.
- Winter crops residues with low decomposition rates, which persist on soil surface for long periods, are required in order to control the soil erosion until next summer crop sowing.