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Doses of poultry litter and swine manure for crop-livestock system integration

Paulo HENTZ[(1)*], Juliano C. CORRÊA[(2)], Renato S. FONTANELI[(3)], Agostinho REBELLATTO[(1)], Rodrigo S. NICOLOSO[(2)], Claudio E.N. SEMMELMANN[(1)], Felipe G. PAPPEN[(1)]
[1] Federal Catarinense Institute campus Concórdia, Concórdia, 89700-000, SC, Brazil; [2] Embrapa Swine and Poultry, 89700-000, Concórdia, SC, Brazil; [3] Embrapa Wheat, 99050-970, Passo Fundo, RS, Brazil.
E-mail address of presenting author*: paulo.hentz@ifc-concordia.edu.br

Introduction

Organic fertilizers derived from poultry litter and swine manure are alternatives which can increase the efficiency in the soil's nutrient availability in relation to mineral fertilizers in integrated crop/livestock systems (ILP). Thus, this study aimed to determine the response of fertilization with doses of poultry litter, swine manure and mineral fertilizers based on the corn yields through the years of 2011-2013 for ILP.

Material and Methods

Experimental design occurred in randomized blocks, in the 4x3+1 factorial, repeated four times. The treatments consisted of four increasing doses of N (0, 100, 200 and 300 kg ha^{-1} N) in interaction with four types of fertilizers, two of them were organic (poultry litter and swine slurry) and two balanced minerals with the same amounts of N, P and K as the organic ones one related to swine manure - M1 and the other poultry litter - M2.

Results and Conclusions

Figure 1 - Corn yields due to increasing levels of nitrogen with organic and mineral fertilizers in integrated crop/livestock systems in the 2011/2012 and 2012/2013 summer crops.

Doses (kg ha^{-1})	0	100	200	300	Regression
			Crop 2011/2012		
Poultry Litter	6.184	8.567 b	8.698 c	11.153 b	6394 + 15,0**x R^2 = 0,91
Swine Manure	6.184	8.410 b	11.753 b	14.629 a	5942 + 28,7**x R^2 = 0,99
M1	6.184	12.666 a	14.925 a	14.118 a	6242 + 80,7**x - 0,182**x^2 R^2 = 0,99
M2	6.184	11.516 a	14.219 a	15.621 a	6250 + 60,5**x - 0,098*x^2 R^2 = 0,99
			Crop 2012/2013		
Poultry Litter	3.327	6.485 ab	7.382	7.812	3416 + 34,8** - 0,07* x^2 R^2 = 0,99
Swine Manure	3.327	6.904 a	7.702	8.826	3482 + 35,7** - 0,06* x^2 R^2 = 0,97
M1	3.327	7.940 a	8.859	8.646	3455 + 53,1** - 0,120** x^2 R^2 = 0,98
M2	3.327	5.378 b	8.250	9.065	3.491 + 20,1** x R^2 = 0,96
			Corn Yield in the system		
Poultry Litter	9.511	15.051 b	16.079 c	18.964 b	9830+49**x – 0,07**x^2 R^2 = 0,92
Swine Manure	9.511	15.313 b	19.455 b	23.454 a	9587+59**x – 0,04**x^2 R^2 = 0,91
M1	9.511	20.605 a	23.783 a	22.763 a	9697+134**x – 0,30**x^2 R^2 = 0,93
M2	9.511	16.893 b	22.469	24.686 a	9434+90**x – 0,13**x^2 R^2 = 0,96

Means followed by different letters in columns at the same dose fertilizers by Student's t-test at 5%.

The positive results of corn yield in both years allowed direct relationship between increasing doses of N with organic and mineral fertilizers and the total production in ILP system (Figure 1). Organic fertilizer with poultry litter and swine manure shows the same efficiency as for as mineral fertilizer when N doses fertilizer were adopted.

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