

Supporting online material

Supplemental Table S1. Estimated production function with damage control specification and pesticide use function

	Production function *		Pesticide use function §	
	(n = 468)		(n = 471)	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-0.380	-0.27	0.460	0.77
Log of fertilizer	0.198	2.27		
Log of labor	0.483	2.37		
Season length (days)	0.017	6.53	0.006	2.39
Medium soil quality (dummy)	0.334	2.29	0.172	1.09
Good soil quality (dummy)	0.765	5.33	-0.042	-0.26
Education (years in school)	0.006	0.65	-0.024	-2.63
Age (years)	-0.008	-2.71	-0.005	-1.71
Madhya Pradesh (dummy)	0.511	3.31	-0.073	-0.42
Tamil Nadu (dummy)	0.562	2.96	0.933	6.37
Bt (dummy)			-0.931	-10.27
Early bollworm infestation			0.231	2.19
Late bollworm infestation ¶			0.073	0.69
<i>Damage control function †</i>				
μ (fixed damage effect)	1.220	2.09		
Bt (dummy)	2.199	1.93		
Insecticide (active ingredients) ‡	0.514	1.82		
Adjusted R ²	0.404		0.344	

* The dependent variable is log of yield per hectare.

† The damage control function has the following logistic specification:

$$\log \{1/[1 + \exp(\mu - \beta_1 Bt - \beta_2 \text{Insecticide})]\},$$

where μ , β_1 , and β_2 are the parameters to be estimated. μ has to be interpreted as a fixed damage effect. Bt is a dummy that takes a value of one for Bt plot observations and zero otherwise, and Insecticide is the amount of active ingredient used per hectare. For conceptual details of the damage control framework see (S1). For previous empirical applications see (S2, S3).

‡ In order to avoid problems of endogeneity, an instrumental variable approach was used. Amounts of active ingredients were predicted based on the pesticide use function shown on the right-hand side of the table. Predicted amounts of active ingredients passed the overidentification test, with bollworm infestation levels as instruments.

§ The dependent variable is amount of active ingredients of insecticides used per hectare.

|| Average number of bollworm larvae per cotton plant in weekly counts during the first 90 days after sowing. Because the number of bollworm larvae is influenced by Bt, infestation data for Bt plots were replaced by counts on conventional counterpart plots on the same farm. Infestation levels were measured ex ante to spraying decisions. Thus, a possible problem of reverse causality is avoided.

¶ Average number of bollworm larvae per cotton plant in weekly counts later in the season (after 90 days). Other explanations as in footnote ||.

Supplemental References

S1. E. Lichtenberg, D. Zilberman, *Amer. J. Agr. Econ.* **68**, 261-273 (1986).

S2. B.A. Babcock, E. Lichtenberg, D. Zilberman, *Amer. J. Agr. Econ.* **74**, 163-172 (1992).

S3. J. Huang, R. Hu, S. Rozelle, F. Qiao, C.E. Pray, *Austral. J. Agr. Res. Econ.* **46**, 367-387 (2002).