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- S. Sithanatham, V. Rameshwar Rao, and W. Reed (ICRISAT)

Differences of Some Chemical Constituents of Pigeonpea Podwalls in Relation to Podfly Susceptibility

The differences in susceptibility of pigeonpea cultivars to podfly, *Melanagromyza obtusa*, are being studied at ICRISAT. Some morphological and anatomical characters of the podwall are probably associated with differences in susceptibility to this pest and water sprays on the fruiting terminals have been found to induce greater oviposition in several cultivars (Sithanatham et al. 1980). Here we present our preliminary observations on some chemical constituents of the podwall in relation to podfly susceptibility, based on joint work done by the pulse entomology and biochemistry units at ICRISAT during 1979-81.

We sampled the pods in several cultivars, that were known to differ in their susceptibility to podfly infestation, from the rainy season plantings in pesticide-free fields of ICRISAT during 1979-81. These samples included those from water-sprayed ("washed") and control ("unwashed") terminals. The pods were opened, seeds removed and the podwalls were then dried in an oven at about 65°C, ground into fine powder and analyzed for their content of total nitrogen, total soluble sugars and total polyphenols.

The podwalls of more susceptible cultivars had a significantly lower concentration of total soluble sugars than the less susceptible cultivars and a narrower ratio of sugars to nitrogen, but there were no significant differences in total nitrogen and total polyphenol contents between the two groups (Table 1). These results suggest that a detailed analysis of the various sugars in the podwall of more and less susceptible cultivars may be useful. Pods from 'washed' terminals had significantly lower concentrations of all three constituents in their walls, than the 'unwashed' ones. The relative role of the individual constituents inhibiting oviposition in the 'unwashed' pods will have to be assessed through bioassay tests.

We also analyzed the chemical contents of the podwalls of pods at different stages of

Table 1. Summary of biochemical comparison of pigeonpea podwall composition in relation to podfly susceptibility, ICRISAT Center, 1979-81.

	Constituents on dry weight basis			
	Total nitrogen (%)	Total soluble sugars (%)	Ratio of sugar: nitrogen	Total polyphenols (mg/g)
<u>Podfly susceptibility</u> (36 reps/treatment)				
Less susceptible	2.64	4.16	1.58	73.7
More susceptible	2.64	3.43	1.32	75.2
CD (5%)	NS	0.67	0.26	NS
<u>Effect of pod 'washing'</u>				
Washed pods	2.62	3.50	1.35	66.7
Unwashed pods	2.66	4.08	1.55	82.1
CD (5%)	0.03	0.17	0.06	7.2

maturity, ranging from young to partially mature pods. We found no significant differences in the total sugar contents but the younger pods tended to have more total nitrogen and polyphenols. The differences in total sugar contents between more and less susceptible cultivars could be detected both in the younger and older pods. Our calculations were based upon the dry weight of podwalls but we also found that similar differences were obtained when the fresh weights of podwalls were used for calculations.

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Reference

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- S. Sithanantham, Umaid Singh, W. Reed, and R. Jambunathan (ICRISAT)

Apion clavipes, a New Pest of Pigeonpea in Bihar, India

Of the three major pigeonpea pests, the podfly (*Melanagromyza obtusa* Malloch), the pod borer (*Heliothis armigera* Hb.) and the plume moth (*Exelastis atomosa* W.), the first has been the most damaging in Bihar. But in 1979-80 a widespread attack of *Apion clavipes* Gerst was recorded in the districts of Muzaffarpur and Samastipur, damaging up to 65% of the pods.

The adult is a small black weevil which damages the tender leaves and flowers by eating tiny holes in them. The creamy white grubs are found within the pods, feeding on the developing grains.

Both medium- and late-maturing varieties were severely damaged by this pest during 1978 and 1979 at Dholi Farm, Rajendra Agricultural University, Bihar (Table 1). It can be seen that the weevil was as damaging as the podfly.

Recently, September sowing of pigeonpea has been introduced in Bihar and in 1979 the incidence of this weevil was recorded both on September- and the July-sown crops in farmers' fields. These data (Table 2) indicate that pest damage on cv Bahar, sown in September, was generally less than that of the July-sown local cultivar.

A localized low incidence of this weevil has also been observed in south Bihar, particularly in Bhagalpur and Munger districts. Further work is in progress. We are grateful to Dr. N.P. Sinha, Principal, TCA, Dholi and Dr. S.K. Chaudhary, Chief Scientist (P) for providing the necessary facilities and to Dr. M.L. Cox of the Commonwealth Insti-

Table 1. Pod damage caused by the weevil *A. clavipes* and podfly at Dholi Farm, Bihar, India.

	Percent damaged pods (range)			
	1978		1979	
	Weevil	Podfly	Weevil	Podfly
Medium-maturity varieties	22.7 to 35.1	14.4 to 18.2	22.1 to 42.9	10.7 to 25.0
Late-maturing varieties	7.1 to 34.5	26.6 to 40.8	29.3 to 64.6	9.5 to 25.9

Table 2. Percent pigeonpea pods damaged in farmers' fields near Dholi in 1979.

Sowing time	Variety	Pod damage (%) caused by	
		Weevil	Podfly
July sown (Traditional)	Local	31.5 to 59.5	25.5 to 35.5
		7.5 to 24.5	6.5 to 18.5
September sown	Bahar		