

Improvized balance to measure groundnut leaf toughness

The simple improvized device depicts the values of hardness directly on the balance.

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THOUGH RESISTANCE to insect pests in groundnut is not well documented, the contributing factors for resistance against some of the major insect pests like Jassids¹, tobacco caterpillar (*Spodoptera litura*), aphids (*Aphis craccivora* Kach) and leaf miner¹ (*Aproaerema* upper (abaxial) surface of the tender leaves.

modicalls Dev) are known. However, the morphological and biochemical bases of resistance have been studied in relatively very few cases.

The neonate larvae of both *Spodoptera litura* and *Helicoverpa armigera* feed by scraping the upper (abaxial) surface of the tender leaves.

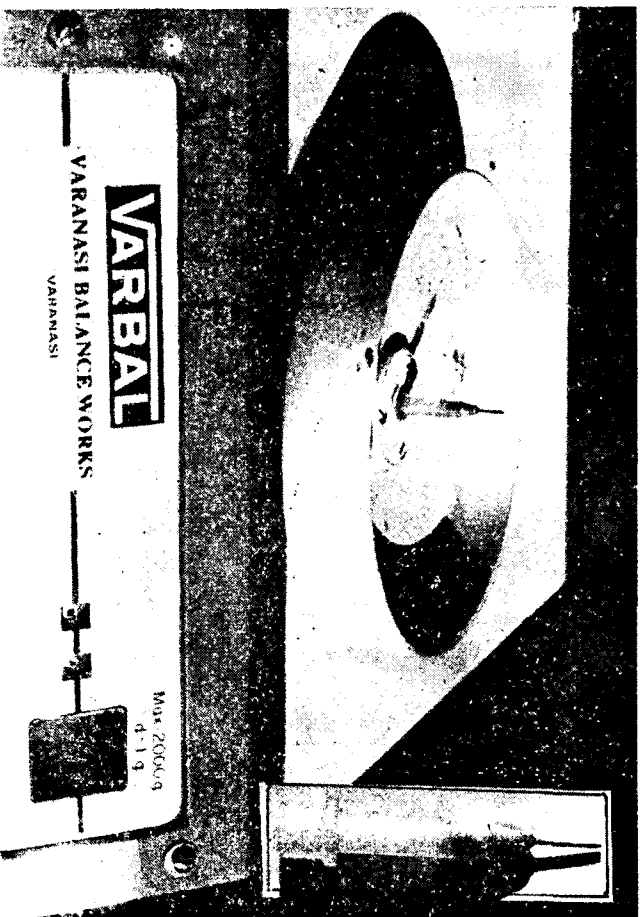


Fig. 1. The improvized balance: the tubing fitted with the needle is fixed into the hole at the centre of the pan with quick-fix.

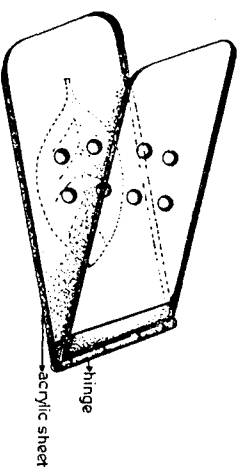


Fig. 2. Acrylic sheet holder for leaf (Position of leaf shown as dotted lines).

The red hairy caterpillar (*Amsacta abisriga*) and the jassids feed on the under (adaxial) surface of the leaf.

Toughness of the organs/tissues is considered to be one of the factors conferring resistance to these pests. To measure the toughness or hardness of the rind of sugarcane, a tensionmeter was used². In such a tensionmeter, weights are added on to a pan with a needle resting on the rind until it is pierced by the needle. In the present improvisation, however, values can be read directly on the balance and the cumbersome process of adding the weights is avoided. This instrument measures the toughness of groundnut leaf with precision and repeatability.

Design of instrument

The new device consists of an electric top pan balance and a plastic tubing fitted with a 1.5 cm long needle of tip diameter 0.7 mm. The tubing fitted with the needle is fixed into the hole at the centre of the pan with quick-fix (Fig. 1). The weight of the top cover is compensated by adding external weights. The improvisation would be more convenient if we use a digital electronic top pan balance.

Two acrylic sheets (10 cm L x 5 cm W) are pasted together at one end with a hinge. In the middle of the sheets four holes (5 mm diameter) corresponding to four predetermined places in the leaflet are drilled (Fig. 2).

Testing of toughness

The leaflet is placed between the acrylic

Table 1. Significance of differences between observations.

n ¹	Calculated t ²	Table value t ³	Significance
		5% 1%	
1. 576	1.78	1.96	2.56
2. 576	1.12	"	"
3. 576	0.19	"	"
4. 576	0.003	"	"
5. 576	0.33	"	"
6. 576	2.10	"	"
7. 576	1.33	"	"
8. 576	1.13	"	"
9. 576	1.21	"	"
10. 576	0.32	"	"

*Significant at 5% level. NS: Not significant.

sheets as marked (Fig. 2) and the leaf portion exposed through the hole is positioned on the needle and pressed. The instant the needle pierces the leaf, the reading on the vernier scale is noted. No lateral force should be allowed to operate while pressing the leaf and the acrylic holder should be kept horizontal to the base.

The repeatability of the test results was confirmed by using pairs of samples in 18 tests. All the leaves used in this study were 4-4 leaves of the main branch. The data were analysed by paired 't' test. The results (Table 1) showed no significant difference between the two sets of observations. This shows the reliability of the method, which means that this improvisation can be effectively used to measure the toughness of groundnut leaf.

References

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