

TABLE I

Comparison of anti-inflammatory activity of *Lawsonia Inermis* with Hydrocortisone

	Control Normal saline	Drug 10 mg/kg	Hydrocortisone 10 mg/kg
1. Brodie's hind paw oedema test	10.73	7.75	7.60
(a) Ankle diameter (in mm)	SE \pm 0.004	SE \pm 0.001 $p < 0.001$	SE \pm 0.007 $p < 0.001$
(b) Paw diameter (in mm)	10.73	7.44	8.50
	SE \pm 0.024	SE \pm 0.021 $p < 0.001$	SE \pm 0.10 $p < 0.01$
(c) Paw volume (in ml)	21.50	18.00	17.30
	SE \pm 0.021	SE \pm 0.004 $p < 0.001$	SE \pm 0.10 $p < 0.01$
2. Granuloma pouch test			
Weight of granuloma pouches (in g)	1.69	1.36	1.40
	SE \pm 0.004	SE \pm 0.014 $p < 0.001$	SE \pm 0.021 $p < 0.05$
3. Lint pellet test			
Weight difference of Lint pelletes (in mg)	4.00	1.38	1.0
	SE \pm 0.04	SE \pm 0.014 $p < 0.001$	SE \pm 0.129 $p < 0.2$

The readings are the average of four observations in each case.

An analysis of the results reveals that the alcoholic extract of *Lawsonia inermis* is endowed with anti-inflammatory activity as revealed by Brodie's hind paw oedema test, Granuloma pouch test and Lint pellet test. The anti-inflammatory activity of *Lawsonia inermis* is comparable to that of hydrocortisone.

25 November 1981

ON THE DEVELOPMENTAL MORPHOLOGY OF SOME ABNORMAL STOMATAL TYPES IN THE LEAF GALLS OF *BARLERIA PRIONOTIS* LINN., (ACANTHACEAE) INDUCED BY *FERISINA VIRGATA* (COCCIDAE: INSECTA)

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INVESTIGATIONS on the comparative morphology of stomata on insect-induced galls though better known¹⁻³, studies on the developmental morphology of these abnormal types appear meagre. Studies on the morphogenesis of the galls of *Barleria prionotis* induced by a coccid, resulting in abnormal rolling and twisting of leaves provided interesting data on the stomatal types whose developmental patterns are discussed.

Developmental stages of normal and galled leaves were collected from the Campus Garden and fixed in FAA. Epidermal peels were obtained by macerating in Jeffrey's fluid; they were stained with toluidine Blue, and mounted in 50% glycerine.

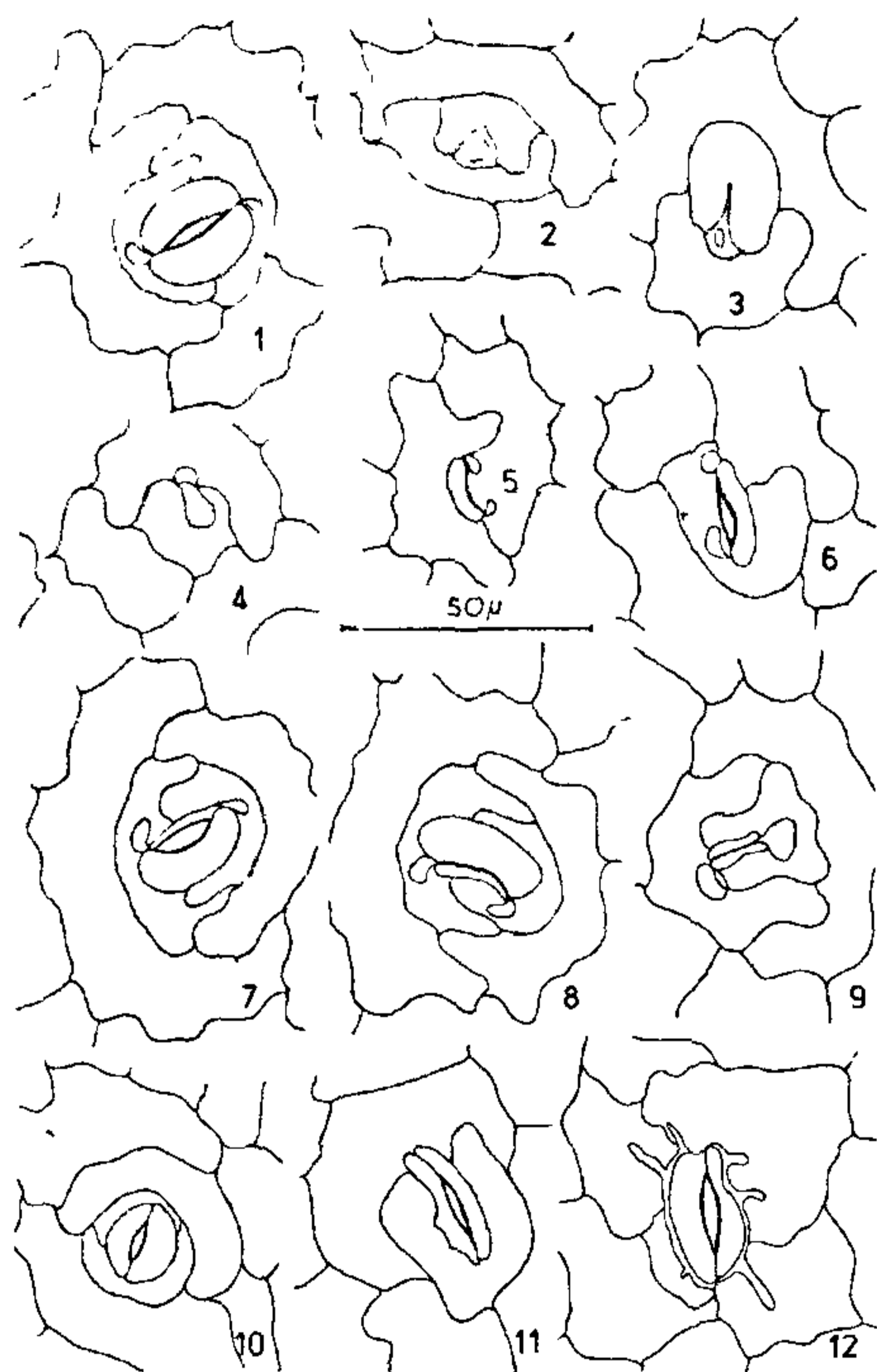


Figure 1 Stomata in normal leaves. 2-12. Different types of abnormal stomata in mature galled leaves.

Normal leaves bear hypostomatic, diacytic stomata of size $34 \times 12\mu$ (figure 1) with a stomatal index of 32.5. The mature, galled leaves possess stomata of the size $31 \times 18\mu$ with stomatal index 35.3. The abnormalities could be grouped into 2 major categories: (i) persistent stomatal initials, and (ii) stomata with single guard cell. In the first type, the meristemoid after forming two subsidiary cells remains with intact protoplast and without further development. These cells are triangular and thin-walled (figure 2), or elongated and pointed along one of the ends (figure 3), or occasionally show a degenerated profile (figure 4). In the second category, viz., stomata with single guard cell, the guard mother cell directly becomes a single, bean-shaped guard cell and remains smaller in size than the normal ones (figure 5). Sometimes, guard mother cells give rise to two guard cell initials out of

which one develops into a guard cell equal to that of a normal stoma while the other degenerates. Such stomata possess a pore as well (figure 6). In some cases two guard cells are formed out of which one does not grow further after an initial period of development; these stomata may (figure 7) or may not (figure 8) develop a pore. Both guard cells degenerate in some instances assuming a peculiar shape (figure 9). Some stomata are much smaller than the normal ones and possess perfect semicircular guard cells instead of bean shaped ones (figure 10). Some stomata possess guard cells with denticulate or wavy outer walls (figure 11) long finger-like extensions from the outer walls of the guard cells projecting into the neighbouring epidermal cells. (figure 12).

Manifestation of the abnormalities caused by the cecidozoan is evident at two levels: (i) in the number of stomata per unit area, and (ii) in individual stomata. Increase in stomatal index indicates the increase in number of stomata per unit area and the eventual reduction in stomatal size. Degeneration, under development of component cells of stomatal complex, and variations in the dimensions of stomata are some of the abnormalities met with in individual stomata. Degeneration of stomata is probably due to the infection after the stomata have been differentiated, and under-development of stomata could be due to infection during early stage of leaf differentiation. Examining the incidence of abnormal stomata in normal leaves, Farooqui⁴ proposes that chemical factors such as enzymes, growth substances, etc., are withdrawn or replaced by factors favouring leaf maturation. While this could be so in normal-systems, in gall-systems where profound chemical alterations are known these abnormalities seem to develop as a result of an interaction between the stress-impact of the gall-maker and the resisting developmental mechanism of the host-plant.

7 December 1981

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