

## STOMATA OF TRILLIUM NIVALE.

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Gümbel<sup>1</sup> was the first to make known the presence of twin stomata. Since that time Pfitzer<sup>2</sup> and others have shown the presence of stomata in groups of two or more on the leaves of various plants. In *Saxifraga sarmontosa* stomata are arranged "in circular groups"<sup>3</sup> in considerable number. In various species of *Begonias*, as De Bary states<sup>4</sup> in *Begonia manicata*, *B. spathulata*, *B. Dregei* and *B. heracleifolia* two or more stomata are arranged over one respiratory cavity.

This occasional grouping of the stomata in certain plants is even more strikingly shown in *Trillium nivale*. The stomata are often found on the leaves in pairs over a common respiratory cavity, but frequently in numbers up to ten or more. In opening and closing they act just as a single stoma does.

The presence of more than one stoma over a common respiratory cavity is also shown on the sepals and petals. Figure 1 shows part of a sepal of *Trillium nivale* in which the stomata are in pairs in one case and in threes in another case over a common respiratory cavity. These arise from the successive division of a common mother cell. The stomata on the sepals and petals are frequently lateral or diagonal as regards one another, but in every case their origin from one mother cell is the same. The arrangement in groups of as many as ten or more over one respiratory cavity on the sepals or petals is also met with.

Figure 2 shows a case, taken from the outside of a sepal, where only one guard cell, A, is fully formed. There is only a remnant of a second guard cell, B. The same thing has also been observed on the inside of the petal.

<sup>1</sup>Gümbel. *Jahr. für wiss. Bot.* Bd. 7, p. 551.

<sup>2</sup>Pfitzer, E. *Jahr für wiss. Bot.* Bd. 7, pp. 532-560.

<sup>3</sup>*Treviranus. Verm. Schriften*, IV. 30. Quoted from DeBary, A. *Comparative Anatomy of Phanerogams and Ferns*. 1884 p. 47.

<sup>4</sup>Vivani. Quoted from DeBary as above.

In Figure 3 a pair of stomata is shown in which only three guard cells were formed. In this case the apertures are closed by the movement of the two outer guard cells only.

These deviations from the general order, position and number of stomata in *Trillium nivale* also obtains, but to a less extent, in other species of the genus *Trillium*. It is also in keeping with other deviations, for which the genus *Trillium* is noted, such as monstrosities in the leaves themselves and in the parts of the flower. Interesting questions are connected with the twin, triple and grouped stomata of *Trillium nivale* and other plants as to their complete development, the real causes of their arrangement and their physiological reactions.

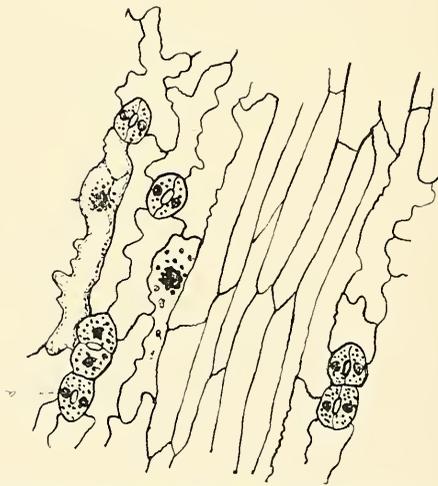


FIG. 1. *Trillium Nivale*. Stomata from outside of sepal showing double and triple groups over one respiratory cavity. x ca. 160.

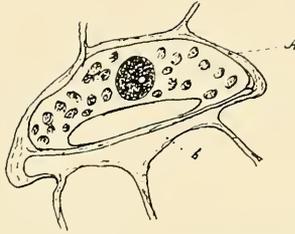


FIG. 2. *Trillium Nivale*. Stoma with only one fully developed guard-cell. x 45.

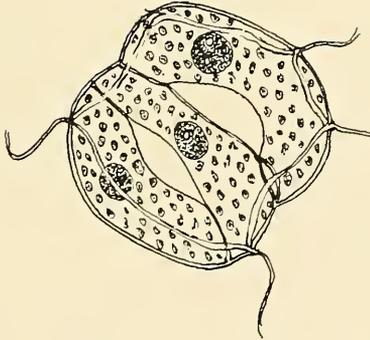


FIG. 3. *Trillium Nivale*. Stomata from sepal. x 45.

