

WITCHES BROOM

by

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In the October issue 1952 a short article on the development of green flowers in *Catharanthus roseus* was published by P. van Glinstra Bleeker. The author describes this phenomenon in such a clear way, that the striking conformity with the virus disease "witches broom", that I met with in nearly all the leguminous crops, is very obvious. This disease is scattered in peanut growing countries all over the world and it owes its name (Heksenbezem, Balai de sorcière, Witches broom, Clump disease) to the heavy branching of the diseased plants. Most authors, however, when describing the symptoms, mention shooting of the adventitious buds as the cause of the phenomenon. In my opinion the plants get their specific appearance by the proliferation of the *flowerbuds*. First I want to mention the symptoms I observed in *Arachis hypogaea* L., *Crotalaria asaramuensis* B a k., *Crot. juncea* L., *Phaseolus calcaratus* R o x b., *Ph. radiatus* L. and *Vigna sinensis* E n d l. and afterwards I want to make a comparison between the symptoms as described by Glinstra Bleeker and my own observations in order to establish the similarity. Figures 1 to 4 were made from diseased plants of *Crotalaria juncea*. This species has large flowers and therefore displays the symptoms more clearly than some other legumes with smaller flowers. All photographs were taken by F. Huysmans of Kebon Raya Indonesia, Bogor.

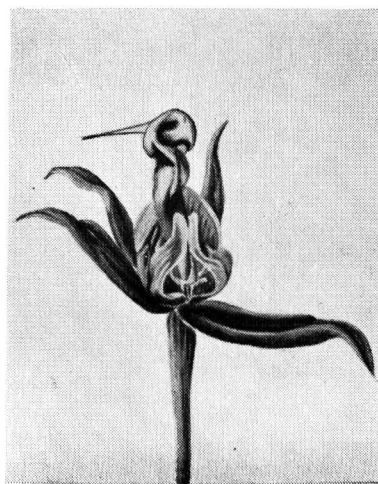


Fig. 1.: A flower in which the sepals were as yellow as normal flowers, whereas the ovary was deformed and distended so as to protrude beyond its normal position. The pistil has been lost.

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Glinstra Bleeker describes the symptoms like this :

".....flowers with a yellowish tinge and with their corolla tubes showing distentions, which burst and displayed a tangled mass of green, that looked like crumpled stamens and pistils; the gradual change of green flowers with distinct petaloid forms into a fan-shaped bundle of normal leaves, clearing the way for the growing apex at that;"

"The growth of several stalks out of the green flowers, the petals of which at last displayed more or less distinctly the shape of leaves, was attended with the formation of new rings of five, mostly very narrow, pointed leaves."

"In some instances these leaves looked very queer and as a matter of fact each of them consisted of two leaves, their midribs having grown together back to back."

"Moreover there were instances in which the proliferations gave life to rings of five leaflets, each of these consisting of a leafblade, which displayed a secondary leaflet....."

Summarizing we can say that the flowers turn green, the petals be-

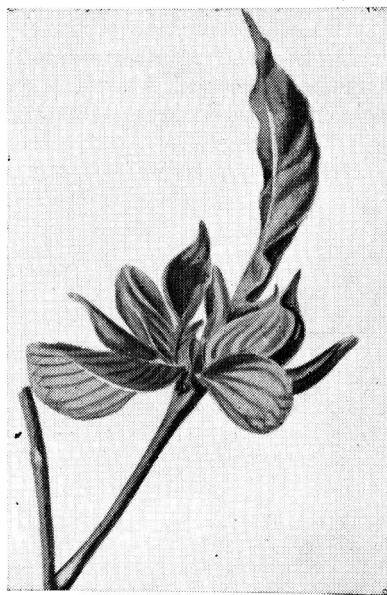


Fig. 2.: Instead of an ovary there is a normal green leaf.

come leaf-shaped, and the formation of whorls of 5 narrow leaves, sometimes very oddly shaped, can be observed.

These are just the symptoms we can expect after proliferation of a flower bud. The whorl of 5 narrow leaves is nothing else but the 5 deformed stamens and I think that the tiny leaves, attached to the deformed stamens, originate of the anthers.

The close similarity of the symptoms described by Glinstra Bleeker and those of the Witches Broom disease make it quite possible that the phenomenon observed on *Catharanthus* is also caused by a virus. It becomes even probable when Glinstra Bleeker is writing: "To one of the main branches as well as to the lowest side-branches of another main-branch developed in successive rate a lot of abnormal flowers." This gives the impression that the inoculation took place on the first main-branch and was then transported in basal direction until it reached the other branch. It would be interesting if Glinstra Bleeker could try to inoculate healthy plants. By way of information I could mention, that the virus of the Witches Broom disease of peanut cannot be transferred by sap inoculation.

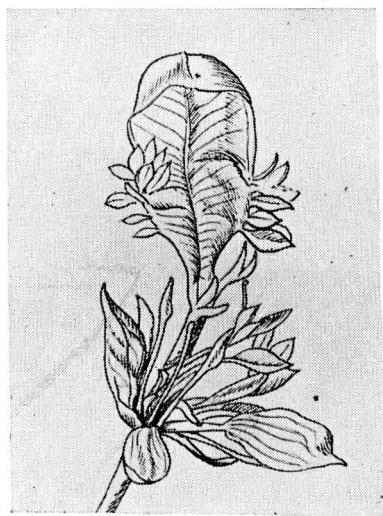


Fig. 3.: The carpel bears small leaves on its margin, these leaves representing the ovules. Moreover there is a whorl of leaves, originating from calyx, corolla and anthers.

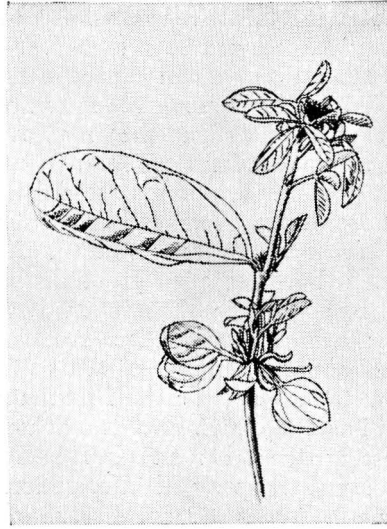


Fig. 4.: The central meristem of the bud develops into a leafbearing stalk.

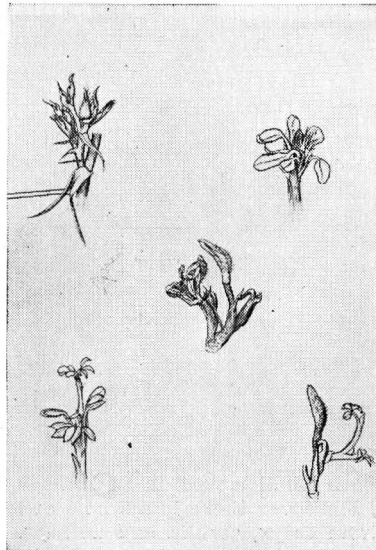


Fig. 5.: Similar deformities on a peanut plant. In consequence of the small-sized flowers, details are less clearly seen. Yet the bursting corolla tube and the emerging parts can be discerned.



Fig. 6.: Close-up of diseased peanut flowers, that had been inoculated at an advanced stage.

Th u n g (1949) demonstrated the possibility of transferring this virus by grafting. Maybe this could be tried with *Catharanthus* too. Since both normal and proliferated flowers occur on the same branch it appears that the virus moves rather slowly in the plant. The stage of development of the flowerbud which the virus attacks, determines the degree of proliferation. The place and time of inoculation determine the amount of proliferation in the inflorescence.

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