

Raspberries on a bifurcate thalamus

BY

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In Vol. IV, p. 145 of the present *Receuil* I had an opportunity of drawing attention to specimens of *Rubus idaeus*, of which the fruits covered a bifurcate thalamus. I pointed out that the thalamus quite gave the impression of having subsequently split up and not of having been dichotomous from the outset as Godron admitted for his cases.

At the end of my paper I had to forego a decisive explanation of my case, owing to the origin of the fruits in question being unknown. Since that time, however, I have had the good fortune to discover the origin of the monstrous raspberries, viz. a garden at Hilversum, called „de Proeftuin” and founded by the „Maatschappij voor Tuinbouw” with a view to cultivate various kinds of fruit and vegetables. In order to test Godron’s statement according to which dichotomy of the torus is the primary cause of the above-mentioned phenomenon, I thought it best to collect raspberries in subsequent stages of development and possessing an **augmented** calyx and did so on June 20 and 27, July 4 and 15 and September 3.

The number of specimens collected amounted to 15, 8, 13, 6 and 2 in the same order as the dates. All these fruits have been carefully examined and have furnished only one receptacle of which the top was dichotomous. As is shown in fig. 1, which represents this torus slightly magnified (the edible part of the fruit having been removed) the whole surface was covered with carpels and could not have been anything but an entire thalamus growing in two directions. The number of carpels amounted to 150, whereas the ordinary number seems not to exceed 100. The calyx is made up of six sepals, a fact noteworthy in itself, since it shows augmentation also in this respect. On the other hand there were 40 specimens possessing quite simple receptacles and showing not even a trace of doubling.

From these facts we are entitled to argue that a really dichotomous torus is a thing of very rare occurrence and cannot possibly account for the great number of raspberries which in 1906 and 1907 and in a less degree in 1908 have been produced in the „Proeftuin”. The characteristics of a subsequent splitting up of the torus (fig. 2), in which also the peduncle often takes part, are so very different from those in fig. 1 that additional proof seems superfluous.

The only question is: at what time and under what conditions does the splitting of the receptacle take place? I have not, indeed, observed the actual moment of splitting but should think that it must coincide with the stage of

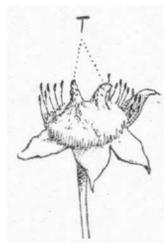


Fig. 1.



Fig. 2.

perfect maturity, since I did not find any indication of it in an unripe fruit. And as to the conditions we must admit that the tension between the numerous vascular bundles in the periphery of the torus and the central parenchymatous tissue becomes so strong that the slightest cause suffices for the tearing up of the weaker portions.

There are two more points worthy of notice.

In the first place the relative scarcity of bifurcation in the summer of 1908 as compared with 1906 and 1907.

The head-gardener, Mr. Verschoor, after being questioned on this point, attributed this striking difference to the great drought of the raspberry-season, and I think his opinion is the right one. For the fruits, of which I examined several in detail, showed an extraordinarily great number of undeveloped drupels and withered styles, almost hidden between ripe drupels; it is obvious that a defective supply of water prevents a normal and vigorous growth and accordingly a powerful tension of the tissues. The other point refers to the number of sepals and its influence upon the phenomenon in question.

In my former paper in which I could only appeal to eight specimens. I pointed out that in five of them the number of sepals had been augmented. This fact, which I thought to be in some way connected with the splitting up of the torus, induced me to look, in 1908, especially for flowers with **supernumerary** sepals, which it was very easy to find. A close examination of the extra sepals has convinced me that they had arisen not so much from augmentation as from the sepalodic character of some of the petals. In this way 1, 2, 3, 4, and even 5 petals may be affected. The last case, viz. of the whole corolla being sepalodic, may have induced Ch. Ferrand to describe a double calyx and to compare it to the calyculus of the *Potentilleae*.

But whether the calyx has been augmented as usually understood, or through sepalody of the petals, the effect will be the same, i. e. the peripheric tension is proportional to the number of coöperating parts but independent of their morphological nature.

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