

NOTE ON THE CHROMOSOMES OF THE GENUS
HYPERICUM, WITH SPECIAL REFERENCE
TO CHROMOSOME SIZE IN *H. CALYGINUM*.

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WITH the exception of four isolated papers published at different times since 1911, the large group of the Guttiferales had been undescribed from a cytological standpoint, until the appearance in the autumn of 1924, in *Hereditas*, of a paper by Niels Neilsen upon "Chromosome numbers in the genus *Hypericum*."

During the summer of 1924, material of several species of *Hypericum* had been collected from the neighbourhood of Oxford, viz. :—*H. humifusum*, *H. quadrangulum*, *H. pulchrum*, and *H. hirsutum* from Bagley Wood, *H. calycinum* from my own garden, and *H. Androsæmum* and *H. elegans* from the Botanical Gardens, Oxford.

Of these species, two—namely, *H. hirsutum* and *H. Androsæmum*—have been discarded, having been examined by Niels Nielsen; the rest belong to the following sections of the natural order Hypericaceæ :—

Section <i>Eremanthe</i>	. . .	<i>H. calycinum</i> , L.
„ <i>Euhypericum</i>	. . .	{ <i>H. humifusum</i> , L. <i>H. quadrangulum</i> , L. <i>H. elegans</i> , Steph. <i>H. pulchrum</i> , L.

The chromosome numbers are found to be :—

<i>H. humifusum</i>	. . . . .	8
<i>H. quadrangulum</i>	. . . . .	8
<i>H. pulchrum</i>	. . . . .	9
<i>H. calycinum</i>	. . . . .	10
<i>H. elegans</i>	. . . . .	16

These numbers fit in with those found by Niels Nielsen for other members of the order; and although the 8's of *H. humifusum* and *H. quadrangulum*, and the 16 of *H. elegans* would seem to point to a series of multiples similar

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to those cited by Winge, as evidence of his rule that there is always a "fundamental number" for the genus, and that the numbers found are multiples of this number; yet the 10 of *H. calycinum* and the 9 of *H. pulchrum* fall outside any such multiple of 8 or 4, and these numbers, taken with those of Niels Nielsen—7, 8, 9, 16, and 20—would show rather that the numbers are not all multiples of one another, nor are they entirely irregular as those found by Heilborn in *Carex*, but rather fall into line with those of the *Crepis* species studied by Rosenberg, Babcock, and Claussen.

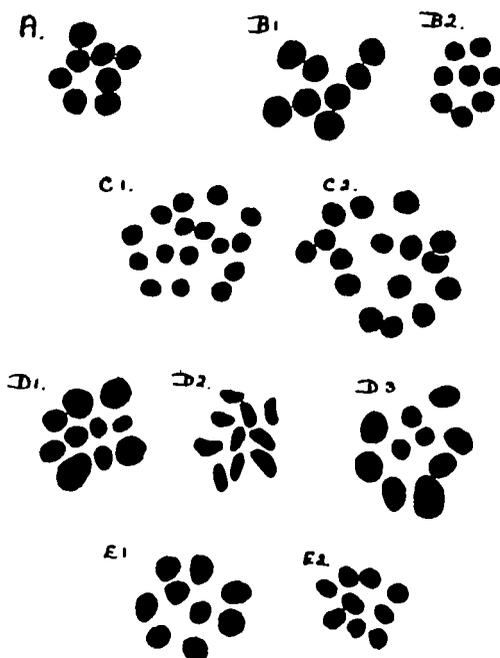
The point of chief interest, however, which has appeared during the course of these investigations is the variation in size between the several component chromosomes of *H. calycinum*. As before mentioned there are 10 chromosomes in this species, and these—in the 200 cases examined—invariably show, even to the most superficial scrutiny, one chromosome conspicuously larger than the rest; and upon more careful and detailed examination of the best plates, *i.e.* ones that were not only very clear, but were also not oblique, there appear to be four classes of chromosomes, *i.e.* one, three, three, three, making up thus the total of ten. The size differences between the three groups of three are less marked than between the largest group and the extra large chromosome, and there might almost be said to be a grading within the groups themselves, giving the appearance of an interrupted decrease in size throughout the whole plate, the interruptions making possible the above division into groups.

Niels Nielsen makes no comment upon the size of the chromosomes beyond stating that they are "rather big," though two of his figures (figs. 7 and 8) show some differences of size among members of the same plate, one in a heterotype and one in a homotype plate. In *H. calycinum*, the one largest chromosome is recognisable, not only in transverse but also in longitudinal sections of the heterotype plate, being much thicker than the others; the less conspicuous size differences in the remaining nine are not so noticeable in plates cut in this direction.

A point of further interest in this species is the fact that the chromosomes of the homotype plate are not only smaller

Chromosomes of the Genus *Hypericum*

(as is usually the case) than those of the heterotype division, but they are of an entirely different shape, being long and narrow and much more of the curved or "sausage" shape so often associated with somatic divisions. There is no mention of any such differences in Niels Nielsen's paper, neither is it noticeable in his figures, which show both homotype and heterotype plates, nor in the other species studied, of which both homotype and heterotype plates are figured here. The investigation of this interesting species is being continued, with the special object of studying the emergence of the paired chromosomes from the spireme in diakinesis in the hope of recognising again in this stage the difference in size of the chromosomes and of establishing a definite order of emergence of the pairs.



A. Heterotype plate. *H. humifusum*.
 B 1. Heterotype, B 2. Homotype plate. *H. quadrangulum*.
 C 2. " C 1. " *H. elegans*.
 D 1 and 3. " D 2. " *H. calycinum*.
 E 1. " E 2. " *H. pulchrum*.
 D 1 and D 3. show the size differences.

Magnification, 2375, reduced by $\frac{1}{2}$. Leitz $\frac{1}{4}$ homm. oil. imm. Oc. 25 camera lucida.

