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THE CHROMOSOME NUMBER OF COCHLEARIA PYRENAICA DC. NEAR MORESNET (BELGIUM)

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SUMMARY

A study was made of the chromosome number of a population of *Cochlearia pyrenaica* DC. occurring near Moresnet in NE. Belgium. The diploid number appears to be 12; no accessory chromosomes were observed. The plants studied are characterized by very large heterochromatic regions which are responsible for the appearance of a conspicuous zonation-pattern in the chromosomes during late anaphase. The possible significance of this phenomenon in the taxonomy of the *Cochlearia* is discussed.

Several workers (ROHNER 1954; LUDWIG 1960; GILL 1965, 1971a,b) have already studied the karyology of the taxon *Cochlearia pyrenaica* DC. After the publications of VAN OOSTSTROOM (1969) and HEIMANS (1971) concerning a population of this species occurring along the Lontzener'Bach near Moresnet, it was considered important to study this population more closely.

C. pyrenaica has a montane-subalpine distribution, with a number of outlying relict stations in Germany, Belgium, and Great Britain (HEIMANS 1971; GILL 1971b). The chromosome number of several montane-subalpine populations has been studied by Rohner, who recorded 2n = 12. The same number was reported by Ludwig for two German populations and by GILL (1971b) for two English ones. The latter author also recorded the incidence of 1 to 4 accessory chromosomes and stated that they are of frequent occurrence in one locality but rare in the other one.

The purpose of the present investigation was to try to establish if the occurrence of the chromosome number 2n = 12 could be confirmed in the Belgian population, and to ascertain the possible incidence of accessory chromosomes. To this end, plants reared from seeds collected near the Lontzener Bach and sown in the experimental garden of the Genetical Institute, Amsterdam were studied by means of root tip squashes of 19 plants. The root tips were pretreated with *p*-dichlorobenzene, fixed in Carnoy mixture and after maceration in N/1 HCl (for 5 min. at 60 °C) stained with aceto-orcein.

The chromosome number of 15 of the plants studied could be established beyond reasonable doubt: 2n = 12 (see *fig.* 1). Accesory chromosomes were not observed.

An unexpected result was the presence of a fairly constant number (viz. 9–10) of heterochromatic regions in nuclei in the interphase stage. These regions are so large that they might be easily mistaken for chromosomes (see *fig.* 2). During

the prophase they become more clearly discernible when they become adjacent to the nuclear membrane. During the final stage of the prophase ultimately twelve chromocentres are present in the nucleus. The pretreated metaphasic chromosomes are too much contracted to exhibit any differentiation, but during the late anaphase heterochromatic regions can clearly be recognized, especially in the area around the centromere (see *fig. 3*). In young pollen tetrads the heterochromatic portions are easily discernible. Their number is 4–5 in this case, which agrees satisfactorily with the numbers found in somatic tissue (see *fig. 4*). According to GILL (1971a) the accessory chromosomes observed by him are euchromatic, so that it is not very likely that there is any connection with the heterochromatic zones in our material. An investigation into the number of such heterochromatic regions in the nuclei of populations with accessory chromosomes is clearly indicated. The chromosomal differentiation found during the present study might also be a valuable aid in inquiries into the relationships within the taxonomically critical genus *Cochlearia*.

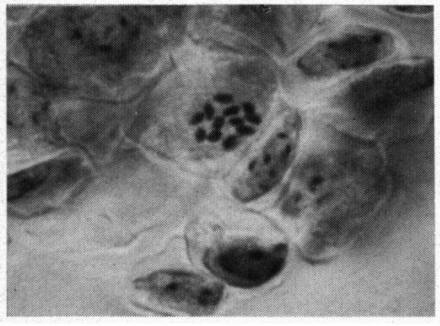

Fig. 1. Mitotic metaphase in root tip material of *Cochlearia pyrenaica*.

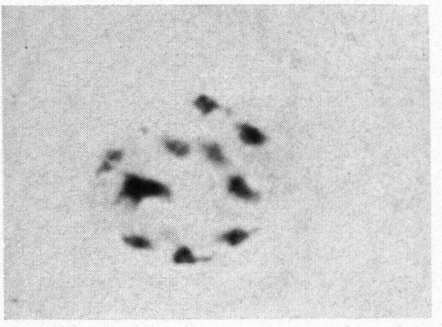

Fig. 2. Nucleus in interphase in root tip material of *C. pyrenaica*.

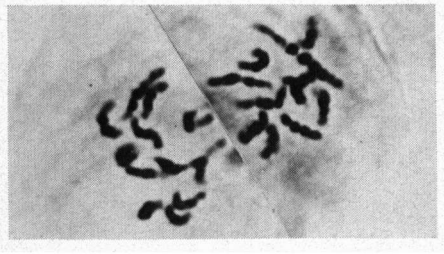

Fig. 3. Mitotic anaphase in root tip material of *C. pyrenaica*. This microphotograph is a combination of two made with a different depth of focusing.

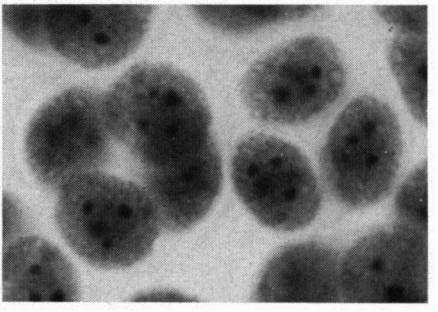

Fig. 4. Pollen tetrads in anthers of flower buds of *C. pyrenaica*. Four or five heterochromatic regions per young pollen grain are present.

HEIMANS (1971) proposed to remove the halophilous taxon *C. officinalis* s.s. from the assembly including *C. pyrenaica*, this in contradistinction to the treatment of the genus in *Flora Europaea* by CHATER & HEYWOOD (1964), who unite *C. officinalis*, *C. pyrenaica* (inclusive *C. alpina* and *C. micacea*), and *C. opolonica* into one species group, and to that in HEGI (1963), in which *C. pyrenaica* is included in the species *C. officinalis*.

The chromosomes of the species of this group hitherto examined are all metacentric and exhibit only a slight variation in length.

Resemblances and differences in the heterochromatic pattern of the different taxa, presumably best discernible by means of Caspersson's fluorescence technique, might provide a welcome addition to the morphological, ecological, and phytogeographical arguments adduced in favour of the various taxonomic treatments of the genus.

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