CYTOPHYLETIC ANALYSIS OF HYMENOXYS ANTHEMOIDES

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This paper reports the chromosomal number for *Hymenoxys anthemoides* (Juss.) Cass., type species of the genus, and relates this datum to the chromosomal situation as known for *Hymenoxys*. The analysis is cytophyletic, in the original meaning of the word (Baldwin, 1939).

Parker (1950) published certain new combinations in *Hymenoxys* Cass. that she later (1951, in manuscript) used in a monograph of this genus. Earlier, she had asked us to survey the chromosomes of *Hymenoxys* and had supplied us with thirty-five collections of seeds representative of both subgenera, of fourteen of the twenty-four species recognized by her, and of five varieties.

Fig. 1. Specimens of *Hymenoxys anthemoides* grown from Argentine seed (*Baldwin 15580*). Six inch scale shown.

Speese and Baldwin (1952) published the results of their studies of *Hymenoxys*: twelve species had 2n numbers of 30; *H. acaulis* (Pursh) Parker had 2n numbers of 60 in three varieties and of 30 in var. *ivesiana* Greene; *H. odorata* DC. had a 2n number of 22. Parker (1960) used chromosomal evidence and stem and leaf characters as bases for raising *H. acaulis* var. *ivesiana* to specific rank: *H. ivesiana* (Greene) K. F. Parker.

Jackson (1957) reported an n number of 15 for *H. argentea* (A. Gray) Parker and thus substantiated our count of 2n of 30 for the species. Turner, Beaman, and Rock (1961) published n numbers of 15 for two species of *Hymenoxys* from Nuevo León, Mexico: *H. insignis* (A. Gray) Ckll., a species of tall biennials not investigated by us and most closely related to *H. grandiflora* (Torr. & Gray) Parker for which we had found that 2n=30; and *H. odorata* (*Rock 264,* TEX), annuals, for which we had reported a 2n number of 22 from New Mexico (*Parker* and *McClintock 7009,* US) and Arizona (*K. Parker 7459,* US). For plants of *H. odorata* from almost the same Arizona station (*P. Raven 11731,* UC), Raven and Kyhos (1961) also determined an n number of 11: they thus corroborate our count for the species. In addition to the count of n=15 for the Nuevo León material of *H. odorata* (*Rock 264*) reported in the 1961 paper, Turner obtained a similar count (*fide* Johnston) for a second Nuevo León collection (*M. C. Johnston 5860*).

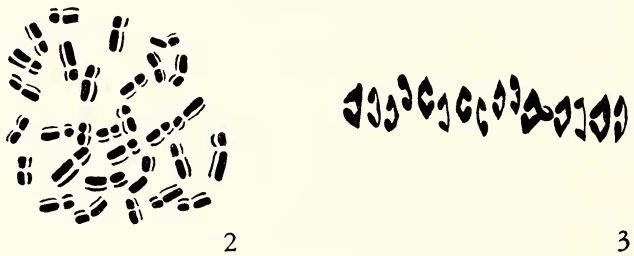

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Fig. 2. Chromosomes of *Hymenoxys anthemoides* (the plants grown from Argentine seed): left, mitotic metaphase, 2n=30; right, metaphase I of meiosis, n=15. Chromosomes were drawn × 2200 and reduced by one-third in reproduction.

Dr. Parker (letter of August 31, 1961) wrote us that all five specimens cited above are typical *H. odorata*. It is clear that the chromosomal situation in this species needs further study. The chromosome counts reported in Turner, Beaman, and Rock (1961) are from pollen-mother-cell smears of buds fixed in the field during the summer of 1959. Our experience has been that preparations from material so fixed are often difficult to interpret, and especially so if the weather were hot at the time of fixation.

Parker (1951) stated that *H. odorata,* a widely distributed annual in the Midwest and Southwest, is closely allied both to the Mexican *H.*

chrysanthemoides DC. and to the South American *H. anthemoides* (Juss.) Cass., type species for the genus, but that these three annuals are quite distinct. Two other species are in South America: one is annual; the other, annual or biennial. Speese and Baldwin (1952) wrote: "If it should be discovered that the South American species—and especially the type species—fall into a chromosome series with *H. odorata* [2n=22: an annual] or into any series different from that evidenced by the majority of *Hymenoxys* representatives as interpreted by Parker [2n=30 or 60: mostly perennials], reason would then be at hand to suspect the validity of Parker's treatment."

Parker, awaiting additional chromosomal data on *Hymenoxys,* has delayed publication of her monograph, and both she and we have made a number of attempts to obtain viable seeds of South American species. Finally, on January 15, 1960, Dr. Arturo Burkart most kindly collected fruiting specimens of *H. anthemoides* and sent them to Dr. Parker, who placed a voucher specimen in the United States National Herbarium, Smithsonian Institution, and sent us plants with mature achenes. We grew seedlings (*Baldwin 15580,* US, fig. 1) and examined their chromosomes: *H. anthemoides* has a 2n number of 30, an n-number of 15 (fig. 2).

In summary, the basic chromosome number of sixteen of twenty-five species (twenty of thirty-one taxa) accepted by Parker (1951, 1960) for *Hymenoxys* and including the type species is 15; the plants are either diploid or tetraploid. The basic number for *H. odorata* is 11. (We assume the report of n=15 for this species to be incorrect.) These numbers indicate phyletic trends. From chromosomal evidence alone, one would conclude that *H. odorata* is wrongly placed in this species. The chromosomal data for the other species, however, lend support from one more discipline to Dr. Parker's interpretation of *Hymenoxys.*

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