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CHROMOSOME NUMBERS IN SOME CALIFORNIAN COMPOSITAE-ASTEREA

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The present chromosome counts were made from plants grown from seeds kindly supplied by Rancho Santa Ana Botanic Garden, Claremont, California. Table 1 lists 16 original counts, 11 of which are from taxa here reported for the first time. The vouchers cited in the table are in the Herbarium of the Garden and are specimens collected at the time the seeds were originally obtained. In some cases the plants from which the counts were made were several generations removed from the original collections, but hybridization was not suspected in any of these.

Root tips were collected from potted plants in the greenhouse and pretreated in a saturated solution of paradichlorobenzene for 2-3 hrs at 15°C and fixed in a Carnoy solution (3 parts absolute ethyl alcohol : 1 part glacial acetic acid) for 20 minutes at room temperature. They were then hydrolyzed in N HCl at 60°C for 3-5 minutes and stained with aceto-orcein. The squash technique was employed in making the slides. Slides were dehydrated in a series of absolute ethyl alcohol, absolute ethyl alcohol and xylol 1 : 1, and xylol and made permanent using DPX as the mounting medium. Permanent slides are in the collection of the Department of Botany, Ontario Agricultural College, and unpublished photomicrographs are in the possession of the senior author.

The authors are greatly indebted to Dr. Peter H. Raven of the Rancho Santa Ana Botanic Garden for aid during the preparation of the manuscript and for verifying the identification of the voucher specimens.

DISCUSSION

The chromosome counts for Grindelia camporum, Haplopappus arborescens, H. venetus var. vernonioides, Heterotheca grandiflora, and Monoptilon bellidioides are in agreement with those reported by Raven et al. (Am. J. Botan. 47: 124-132, 1960) for plants from different localities in California. At the generic level, the counts for Baccharis, Chrysothamnus, Corethrogyne, and Grindelia are consistent with the basic chromosome numbers previously reported for these genera (cf. Raven et al., op. cit.). It is interesting that all counts published to date for the predominantly woody genus Baccharis are diploid, as are the new counts here reported for B. sarothroides and B. sergiloides. Our count for B. pilularis subsp. pilularis agrees with that of Raven et al. (op. cit.) for subsp. consanguinea. The chromosome number of the typical variety of Corethrogyne filaginifolia is the same as those previously published for other varieties of that species.
The counts for *Haplopappus squarrosus* subsp. *squarrosus* agree with those of Raven et al. for subsp. *grindelioides* from southern California. It is significant that our count of *H. acradenius* subsp. *eremophilus* from near Victorville is diploid (2n=12) while these authors reported *H. acradenius* subsp. *acradenius* from a few miles east to be tetraploid (2n=24). Judging from the meiotic configurations, Raven (in litt.) considers that his strain of *H. acradenius* subsp. *acradenius* might have been autotetraploid. The new counts for *H. ericoides* and *H. parishii* lend support to the hypothesis of 9 as the basic chromosome number of the shrubby section *Ericameria* which, on morphological grounds, is closely related to the shrubby genus *Chrysothamnus*, which has also x=9.

### Table 1. Chromosome numbers in Compositae-Astereae.

<table>
<thead>
<tr>
<th>NAME</th>
<th>SOMATIC CHROMOSOME NUMBER</th>
<th>LOCALITY AND COLLECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Baccharis pilularis</em> DC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>subsp. pilularis</td>
<td>18*</td>
<td>4 miles south of Pescadero, San Mateo Co., <em>Wolf</em> 1807</td>
</tr>
<tr>
<td>sarothroides Gray</td>
<td>18*</td>
<td>5 miles east of Holtville, Imperial Co., <em>Wolf</em> 9391</td>
</tr>
<tr>
<td>sergilioides Gray</td>
<td>18*</td>
<td>Little San Bernardino Mts., Riverside Co., <em>Wolf</em> 4297</td>
</tr>
<tr>
<td><em>Chrysothamnus paniculatus</em> (Gray) Hall</td>
<td>18*</td>
<td>Morongo Valley, San Bernardino Co., <em>Balls &amp; Everett</em> 22802</td>
</tr>
<tr>
<td><em>Corethrogyne flaginifolia</em> (H. &amp; A.) Nutt. var. flaginifolia</td>
<td>10*</td>
<td>1.5 miles south of Pismo Beach, San Luis Obispo Co., <em>Everett &amp; Balls</em> 18701</td>
</tr>
<tr>
<td><em>Grindelia camporum</em> Greene</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>latifolia</em> Kell.</td>
<td>24</td>
<td>1.3 miles north of Sonora, Toulumne Co., <em>Balls &amp; Everett</em> 18082</td>
</tr>
<tr>
<td><em>stricta</em> subsp. <em>venulosa</em> (Jeps.) Keck</td>
<td>24*</td>
<td>Santa Cruz I., Santa Barbara Co., <em>Balls &amp; Blakley</em> 23743</td>
</tr>
<tr>
<td><em>Haplopappus acradenius</em> subsp. <em>eremophilus</em> (Greene) Hall</td>
<td>12*</td>
<td>Pt. Reyes Lighthouse, Marin Co., <em>Balls</em> 23578</td>
</tr>
<tr>
<td><em>arborescens</em> (Gray) Hall</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>ericoides</em> (Less.) H. &amp; A.</td>
<td>18*</td>
<td>North of Victorville, San Bernardino Co., <em>Balls</em> 22207</td>
</tr>
<tr>
<td><em>parishii</em> (Greene) Blake</td>
<td>18*</td>
<td>5.3 miles northwest of Sonora, Toulumne Co., <em>Balls &amp; Everett</em> 18084</td>
</tr>
<tr>
<td><em>venetus</em> (Kunth) Blake var. <em>vernotoides</em> (Nutt.) Munz</td>
<td>12</td>
<td>Near Julian, San Diego Co., <em>Munz</em> 12230</td>
</tr>
<tr>
<td><em>Heterotheca grandiflora</em> Nutt.</td>
<td>18</td>
<td>Carmel Highlands, Monterey Co., <em>Everett &amp; Balls</em> 18694</td>
</tr>
<tr>
<td><em>Monoptilon belliioides</em> (Gray) Hall</td>
<td>16</td>
<td>2 miles south of Piedras Blancas, San Luis Obispo Co., <em>Everett &amp; Balls</em> 18698</td>
</tr>
</tbody>
</table>

*The chromosome counts marked with an asterisk are reported for the first time.*