of *Spermatites cylix* Arnold, and they appear to be conspecific. Hence, *Spermatites cylix* probably refers to the basal portion of a nucellus from a Cordaitean seed comparable to *Cardiocarpon late-alatum.*

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THE BASIC CHROMOSOME NUMBER OF THE GENUS NEPTUNIA (LEGUMINOSAE-MIMOSOIDEAE)

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The genus *Neptunia* is composed of about ten or eleven species of annual and perennial herbs. Its members are widely distributed in the tropical and subtropical regions of the world. Five species are endemic to the Old World (three in Australia, two in India); two are cosmopolitan, occurring in wet habitats, principally in tropical regions; and three or four are confined to North and South America.

The region with the greatest number and diversity of taxa appears to be Texas and adjacent Mexico where four or five species are represented (Turner, 1951). From a standpoint of floral morphology, this area also retains one of the least modified species in the genus *(Neptunia lutea)*[1].

The first chromosome count reported for a species of the genus was by Dnyansagar (1952). He reported a number of n = 18 from sectioned anther material of the Indian species, *N. triquetra*. However, the camera lucida drawing documenting this count appears to show 18 somatic chromosomes and is perhaps but a portion of the complement of a single somatic cell of premeiotic "mother cell" tissue.

Turner and Beaman (1953) reported counts for three unnamed American taxa of *Neptunia* as 2n = 28. Their counts were obtained from somatic cells of sectioned root tip material. The only other report for the genus has been that of Frahm-Leliveld (1953) who listed an aproximate

[1] All of the described taxa in the genus, except this species, have some flowers with anantherous staminodia modified into petaloid structures. *N. lutea* has flowers with the stamens all alike and anther-bearing.

TABLE 1. SPECIES OF NEPTUNIA EXAMINED FOR CHROMOSOME NUMBER

Species	Seed Source and Voucher Collection	Chromosome Number
**Neptunia dimorphantha* Domin	AUSTRALIA (Seed communicated by Div. of Plant Industry, C.S.I.R.O., Canberra City). *Q227*	2n = 28 (fig. 3)
**Neptunia gracilis* Benth.	AUSTRALIA (As above) *C884*	2n = 56
**Neptunia monosperma* Benth.	AUSTRALIA (As above) *W652*	2n = 28 (fig. 2)
Neptunia plena (L.) Benth.	INDONESIA (Reported by Frahm-Leliveld, 1957)	2n = 78?
Neptunia triquetra Benth.	INDIA (Reported by Dnyansagar, 1952).	n = 18?
**Neptunia prostrata* (Lam.) Baill.	INDIA. Raipur (Seed communicated by Dr. V. R. Dnyansagar). *Turner s.n.*	2n = 56 (fig. 1)
**Neputnia lutea* (Leavenw.) Benth.	TEXAS. Galveston County: *Turner 2189*	2n = 28 fig. 5)
**Neputnia lutea* (Leavenw.) Benth.	TEXAS. Galveston County: *Turner 2923*	2n = 28
**Neptunia pubescens* var. *floridana* (Small) Turner	TEXAS. Galveston County: *Turner 2194*	2n = 28
**Neptunia pubescens* var. *lindheimeri* (B. L. Robinson) Turner	TEXAS. San Patricio County: *M. C. Johnston 541338*	2n = 28 (fig. 4)

* Indicates new report for the genus.

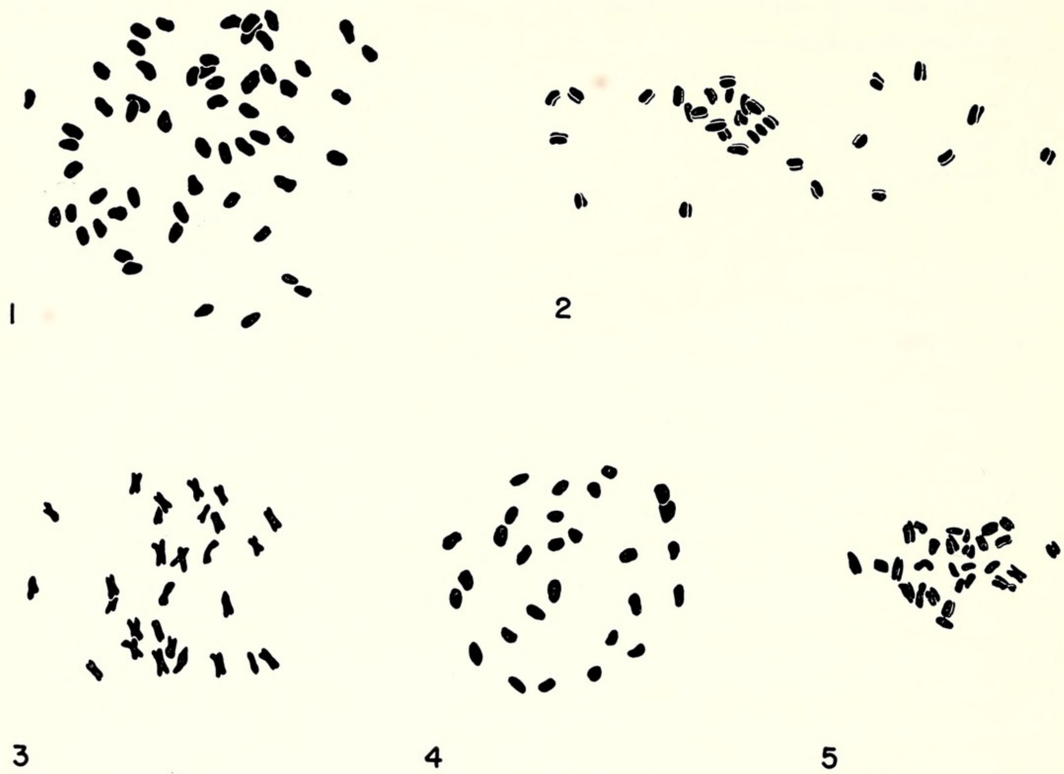
count for *N. plena* as 2n = ± 72; in a later paper Frahm-Leliveld (1956) in reporting the same species, apparently settled on the number 2n = 78, though the drawing documenting this count is not easily interpreted.

Because of the differing base numbers for the genus reported by these workers, and because of the known unibasic nature of most genera in the Leguminosae, the present authors have reinvestigated the previous reports for the taxa reported by Turner and Beaman and in addition have investigated four species previously unreported.[2]

MATERIALS AND METHODS. Chromosome counts listed as new in the present paper (Table 1) were made from root tip cells of germinating seeds using a squash technique outlined by Turner and Fearing (1959). Polyploid cells were noted in the tissue of all the taxa examined, though diploid cells appeared to be more common and this is the number given in Table 1.

RESULTS AND DISCUSSION. Altogether, counts for eight of the approximately ten species in the genus have been reported (Table 1). Except for the doubtful count of n = 18 for *N. triquetra* and the count of *N. plena*

[2] Attempts to obtain seed of the controversial *N. triquetra* have been unsuccessful. The authors are grateful to Dr. V. R. Dnyansagar who so kindly furnished the seed of *N. prostrata* used in the present study.



FIGS. 1–5. Camera lucida drawings of the mitotic chromosomes in *Neptunia* spp.: 1, *N. prostrata* ($2n = 56$); 2, *N. monosperma* ($2n = 28$), late metaphase, 2 pair of chromosomes have already separated and are shown in the "unpaired" condition; 3, *N. dimorphantha* ($2n = 28$); 4, *N. pubescens* var. *lindheimeri* ($2n = 28$), prophase; 5, *N. lutea* ($2n = 28$). (× ca. 1200.)

($2n = 78$), all reported counts have been on a base of $x = 14$. The species here reported are from taxa occurring on several continents, and one of them, *N. lutea,* has a "primitive" floral structure and occurs in a region where several diverse taxa are found. These facts make a base number of $x = 14$ for the genus seem more plausible than that of a multibasic pattern, particularly since *N. triquetra* and *N. plena* are not especially different morphologically from species with known counts of $2n = 28$. In addition it might be noted that related genera of the tribe Adenanthereae, in which *Neptunia* is usually included, are also on a base of $x = 14$ (e.g. *Prosopis* and *Dichrostachys,* Darlington and Wylie, 1956).

SUMMARY

Chromosome numbers for six species of *Neptunia,* all on a base of $x = 14$, are presented for the first time. These counts were obtained from diverse species which occur naturally in Australia, India and Texas. In view of the known constancy of base numbers for most genera of the Leguminosae, and in view of the poor documentation for differing base

numbers reported by other workers, it has been concluded that $x = 14$ is probably the correct base chromosome number for the genus.

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HYBRIDIZATION AND INSTABILITY OF YUCCA

JOHN MILTON WEBBER[1]

The contention that hybridization is largely responsible for the widespread variability of southwestern yuccas (2,4,9)[2] is supported by the following facts. 1) Cross-pollination is enhanced by the yucca's dependence upon the yucca moth for pollination. 2) Two or more species frequently occur in mixed stands or near each other. 3) The karyotypes of all species are strikingly similar (cf. 1). 4) Inter- and intra-specific pollinations produce equally abundant seed. 5) There is little difference in the degree of relationship and the ability to hybridize. 6) Many variants exhibit specific characteristics of two or more species. 7) Apparent hybrids are frequently more fertile than "typical" species. 8) Progenies of apparent hybrids are composed of two or more types. These facts, however, pertain only to putative hybrids and the conditions favoring hybridization. Although a few garden and artificial hybrids (3,8) have been cited, their characteristics, behavior, and fertility have not been recorded. The present study of artificial hybrids indicates that yuccas are genetically similar and that hybridization among native plants is common.

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[1] Agronomist, Crops Research Division, Agriculture Research Service, U.S. D.A., Berkeley, California. Work done in cooperation with Botany Department, University of California, Berkeley, California.

[2] Numbers in parentheses refer to Literature Cited.