with the region proximal to the satellited portion of the secondary nucleolar chromosome. The duplication therefore is confined only to the nucleolus organizing body and its satellited part. Such a view is confirmed from the absence of quadrivalents at metaphase I, which would normally be expected in at least a small proportion of the 100 cells examined had there been any duplication of the short arm of chromosome VI.

As to its origin, it is obviously due to a break at the region of the nucleolus organizing body followed by its transposition to the terminal region of a non-homologous chromosome within the genome. Since fusion can take place only between two broken ends, apparently the recipient chromosome also suffered a simultaneous fracture. Such chromosome breakages could be of a spontaneous type or due to some form of mutagenic effect resulting from the introduction of an alien chromosome into the genome, under particular conditions. Pedigrees of the stocks used in this study show that the breakage-transposition-duplication reported now could not have occurred more than three generations ago:

Pedigree of the material used in the study: (Each generation was selfed)

Plant or Stock No.	Phenotype	
1967-230-4	Lg gl	20+2 corn and tripsacum chromosomes; no evidence of supernumerary nucleoli or other abnormalities at meiosis.
1968-177	Lg gl	Only one plant survived; cytology not studied.
1969-332-3	Lg gl	20+2 chromosomes; supernumerary nucleoli and duplication of nucleolar organizer and satellite noticed.
-4	"	
-5	"	

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19. Comparative studies of American Maydeae and the Andropogoneae: I. Morphology of pachytene chromosomes of Elyonurus tripsacoides.

A knowledge of the morphology of their pachytene chromosomes could indicate the most probable hybrid bridge between the American Maydeae and the more closely related Andropogoneae. If such a hybrid were then produced experimentally, the data on chromosome morphology would serve

further as a basis for an evaluation of their cytogenetic relationships.

Elyonurus and Manisuris share certain floral features leading to the formation of the cupulate fruitcase in the American Maydeae. Except for the knowledge that these two genera have a 2n chromosome number of 20 and 18, they are little understood cytologically. The results from our initial exploratory studies on chromosome morphology in a form of Elyonurus tripsacoides from Veracruz, Mexico, are reported now.

At pachytene the 20 chromosomes form 10 bivalents regularly, of which one is the nucleolus organizing pair. This chromosome differs from maize chromosome 6 in all its essential features. The nucleolus organizing body, though terminally located with the satellited portion distal to it, is present in the long arm; it has an arm ratio of 1.2, a total length of about 26 microns and occupies the 9th position in the order of its length relative to others within the complement. The rest of the chromosomes fall into 9 other length categories and have their centromeres in the median to submedian positions. There are no other markers such as knobs or distinctive chromomere patterns for any of the chromosomes; however, the regions adjacent to the centromere are more darkly stained than the rest of the arms. Besides the nucleolus organizing chromosome, chromosome 6 can be readily distinguished by virtue of its distinctive arm ratio of over 6.0. The other chromosomes can be identified only when both the total length and arm ratio are considered together as diagnostic criteria.

Although 317 observations have been made on individual chromosomes, the entire chromosome complement could be traced in nine pollen mother cells. Averages from the latter are given in the following table.

Length and arm ratios of the pachytene chromosomes of Elyonurus tripsacoides (2n=20).

Chromosome No.	Short arm (microns)	Long arm (microns)	Total length (microns)	Arm ratio
1	24.3	27.5	53.5	1.1
2	18.0	25.2	44.6	1.4
3	14.0	24.9	40.0	1.8
4	14.0	20.6	35.8	1.5
5	12.6	17.2	30.9	1.4
6	4.0	24.6	29.5	6.2
7	12.6	13.7	27.5	1.1
8	9.7	15.4	26.3	1.6
9	11.2	13.7*	26.3	1.3
10	8.9	10.6	20.6	1.2

*Nucleolus organizing body terminal on this arm.

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20. Rate of pollen tube growth.

Because the apparent transmission rate of a tripsacum chromosome marked by the Su locus varied with the quantity of pollen applied to the styles, an attempt was made to determine if a differential rate in Su vs su tube growth was involved. Equality in transmission between the sugary pollen with 10 chromosomes and the pollen with 10+1 chromosomes, in which the extra chromosome was marked by the starchy gene, should yield a 1 su to 1 Su ratio on homozygous sugary styles. Although cutting the styles back by one inch at 4, 5 and 6 hours after pollination did not change the set of Su to su kernels, the data on rate of tube growth are of interest in regard to the safe time for cutting back exposed styles (Table 1).