MORPHOLOGICAL AND KARYOTYPE STUDIES OF THE GENUS *Anglocalyx* (Taub) L.

by

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INTRODUCTION

The genus *Anglocalyx* (Taub) Linn is a small one belonging to the family Fabaceae in the order Fabales. The genus has three recorded species. The species of the genus have been recorded as occurring in several parts of Africa (Hutchinson and Dalziel, 1956). The species *Anglocalyx oligophyllus* has been identified as a very potent herb for the traditional therapeutics of fire burns and sores. When prepared with other herbs, it has also been used for the treatment of painful dismenorrhea (Abia William, 1994, Personal Communication).

The present study is aimed at providing baseline morphological data and the chromosome analysis of species. This information is also expected to enhance the taxonomy of this important genus.

The interest in this genus is created by its implication in traditional decoctions for the treatment of several bacterial diseases.

MATERIALS AND METHODS

Whole mature plants of the three species of *Anglocalyx* were identified and collected from the wild from several locations in Akwa Ibom State and its environs. Some were cultivated in the University of Uyo Tradomedical farm. Some plants were grown in saw dust in plastic containers to facilitate easy uprooting and subsequent harvesting of root tips.

The chosen morphological characters were measured using standard taxonomic practices. (Gill and Hussaine, 1985). The morphological data were subjected to simple statistical analysis. Root tips were harvested directly into acetic acid: ethanol (1:3 v/v) fixative and stored in a refrigerator until required for examination. Root tips squashes were done using standard methods of cytogenetics (Olorode, 1974).

Measurements of the chromosome lengths and arm lengths were done using the occular micrometer and subsequently converted to millimetre using a stage micrometer. Arm ratios were also calculated. The idiographs of the chromosomes are prepared using the full block representation.

RESULTS AND DISCUSSION

Morphologically each species exhibited a strict uniformity in character. Measurements of the morphological characters are presented in Table 1. The mean leaf length of *anglocalyx zenkeri* (18.82 ± 3.48 cm) was greater than those of *A. oligophyllus* (13.51 ± 2.58 cm) and *A. talbotii* (17.91 ± 2.56 cm).

Similarly, the mean leaf breath of *A. oligophyllus* 5.30 ± 1.73 was consistently smaller than those of the other two species (*A. zenkeri*, 7.75 ± 2.08 cm; *A. talbotii*, 7.77 ± 2.84 cm).

The floral characteristics is presented in Table 1. The mean inflorescence length of *A. oligophyllus* was 12.56 ± 2.5 cm. This value is greater than the inflorescence lengths of *A. zenkeri* (4.15 ± 1.55 cm) and *A. talbotii* (1.81 ± 0.05 cm).

There was a positive correlation (+ 7.21 at 0.95) between the length of inflorescence and the number of flowers. Consequently the number of flowers per inflorescence was highest in *A. oligophyllus* (20.00 ± 5.81). The pedicel length was also greater in *A. oligophyllus* (11.21 ± 1.98) than in *A. zenkeri* (3.89 ± 1.05) and *A. talbotii* (2.91 ± 0.87). There was only a slight variation in morphological data between the cultivated and the wild species.

The chromosome number of 2n = 22 (n = 11) is recorded for the three species of *Anglocalyx*. There was no record of any discrepant chromosome counts in the species studies. The distribution of chromosome per size class is presented in Table 2 and the variation in the chromosome size was consistent within the preparation from each species.

In *A. oligophyllus* a total of eight (8) metacentric chromosomes, twelve (12) submetacentric and two (2) acrocentric chromosomes were recorded. In terms of size six (6) large, eight (8) medium and eight (8) small chromosomes were identified. The smallest chromosome pair, chromosome number (11) eleven was noted to carry the satellite. (Fig. 1)

In *A. zenkeri* fourteen (14) metacentric and eight (8) submetacentric chromosomes were recorded. In terms of size the genome was divided into eight (8) large chromosomes, eight (8) medium sized chromosomes and six (6) small chromosomes. (Fig. 2).

In *A. talbotii*, six (6) metacentric, twelve (12) and four (4) acrocentric chromosomes were counted. It is there evident that the speciation in the genus arose from chromosome reshufflement and probably translocation. The satellite is on chromosome nine (the 9th pair) in *A. zenkeri* and on chromosome eleven (11th pair) in *A. talbotii*. Chromosome eleven in *A. zenkeri* and *A. talbotii* are rather very close in size (16.25 ± 0.82 μm and 16.31 ± 0.86 μm respectively). (Fig. 3)

The symmetry of the karyotype within each species is fairly high because of the record of the metacentric submetacentric as well as acrocentric components. The generally large size of the chromosomes is also consistent within the report of Woolhouse (1978).

SUMMARY

A survey of the vegetative and floral characters of the three species of the genus *Anglocalyx* (Taub) L, *A. oligophyllus*, *A. zenkeri*, and *A. talbotti* was carried out. A chromosome number of 2n =22 was recorded and karyotype analysis of the three species was reported. The mean chromosome lengths (at metaphase) of 714.52µm, 730.40µm and 663.76µm were calculated for *A. oligophyllus*, *A. zenkeri* and *A. talbotti* respectively.

Table 1: Plant height, floral and leaf measurements of the three species of *Anglocalyx*

Species	Length of Inflo. (cm)	No. of flower	Length of flower (cm)	Length of Pedicel (mm)	No. of Leaflets	Leaf length (cm)	Leaf breath (cm)
A. oligophyllus	12.56±2.5	20.00±5.8	1.50 + 1.10	11.21±1.98	6.10±1.09	13.51±2.58	5.30±1.73
A. zenkeri	4.15±1.5	12.36±1.49	1.58+1.22	3.29±1.05	5.51±2.17	18.82±3.48	7.75±2.08
A. talbotii	1.81±0.9	5.87±1.38	1.33+1.01	2.91±0.87	8.13±1.76	17.91±2.56	7.77±2.84

Table Genome composition of *Anglocalyx* species

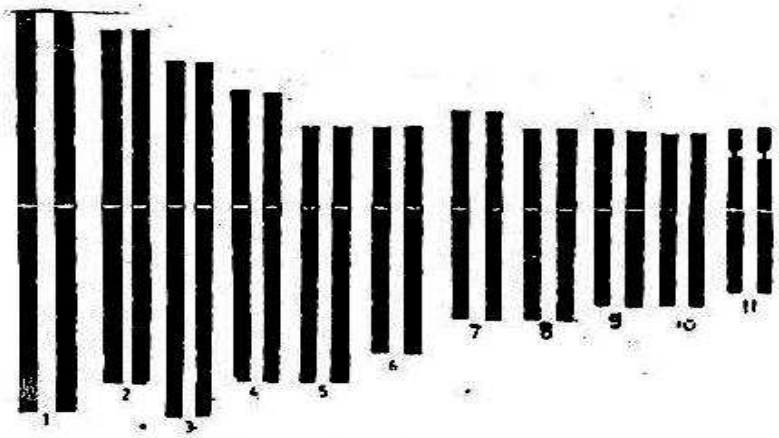
CHROMOSOME DISTRIBUTION WITH THE SPECIES

Type of Chromosome	*A. oligophyllus*				*A. zenkeri*				*A. talbotii*			
	Large	*Medium*	*Small*	*Total*	*Large*	*Medium*	*Small*	*Total*	*Large*	*Medium*	*Small*	*Total*
Metacentric	4	2	2	8	8	4	2	14	–	–	6	6
Submetacentric	2	4	6	12	–	4	4	8	2	10	–	12
Acrocentric	–	2	–	2	–	–	–	–	2	–	2	4
Total	6	8	8	22	8	8	6	22	4	10	8	22

Table 3: Chromosome Lengths and arm ratio of the 22 Chromosomes of the three species of *Anglocalyx* L.

Species	Type of Chromosome	Chromosome Lengths and Arm Ratio									
		No	Large Length (um)	Arm Ratio	No	Medium Lengths (um)	Arm Ratio	No	Small Length (um)	Arm Ratio	Total
		1	52.92±-.98	1.00 ± 0.11	4	36.51 ± 0.94	1.00 ± 0.22	11	21.53 ± 0.43	1.00 ± 0.10	
	Meta	2	44.64±1.44	1.00±0.11							
		3	44.85±1.81	1.44±0.21	6	28.55±0.81	1.80±0.21	8	24.45±0.51	1.40±0.21	
					7	26.40±0.96	1.19±0.21	9	22.87±0.41	1.24±0.10	357.26±6.9
											714.52
								10	22.29±0.41	1.23±0.10	
A. oligophyllus	Submeta.										
	Acro.				5	32.65±0.76	2.20±0.20				
		1	49.92±0.81	1.02±0.23	5	32.55±0.53	1.00±0.12	11	16.25±0.82	1.00±0.10	
		2	46.08±0.80	1.01±0.10	7	28.48±1.41	1.00±0.12				
	Meta	3	45.57±1.21	1.00±0.10							365.20±8.32
A. zenkeri		4	43.99±1.11	1.03±0.12							730.4
					6	30.51±0.75	1.50±0.22	9	22.38±1.03	1.20±0.10	
	Submeta				8	28.21±1.21	1.33±0.10	10	21.26±0.93	1.28±0.21	
	Meta							8	24.41±1.51	1.00±0.10	
								9	24.41±1.51	1.00±0.10	
								11	16.31±0.86	1.00±0.10	
A. Talbotii	Submeta.	2	40.69+0.84	1.50+0.11	3	34.58+1.12	1.43+1.42				
					4	33.99+0.72	1.76+1.61				
					5	31.74+0.91	1.76+1.61				
					6	31.55+0.89	1.35+1.20				331.88+8.41
					7	30.51+0.95	1.43+1.01				663.76
	Acro	1	42.72+0.74	2.50+0.42					21.39+0.91	2.66+1.60	

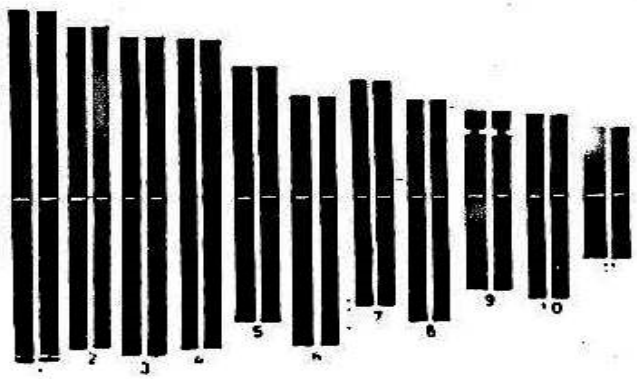
Meta. = Metacentric; Submeta = Submetacentric; Acro = Acrocentric



LEGEND

1. Metacentric la
2. Metacentric la
3. Submetacentric large
4. Metacentric medium
5. Acrocentric medium
6. Submetacentric medium
7. Submetacentric medium
8. Metacentric small
9. Submetacentric small
10. Submetacentric small
11. Metacentric small

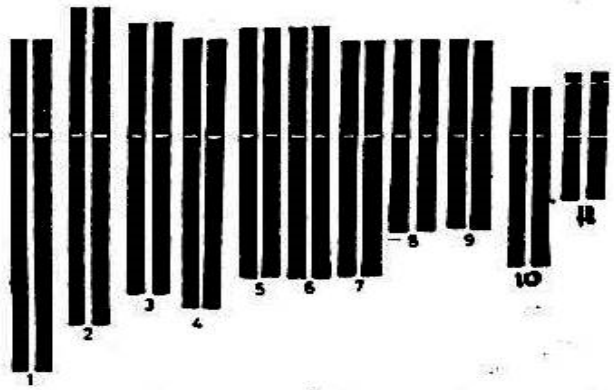
Fig. 1: Idiograph of the chromosome of *Anglocalyx oligophyllus*. The eleventh pair is the satellited chromosome.



LEGEND

1. Metacentric large
2. Metacentric large
3. Metacentric large
4. Metacentric large
5. Metacentric medium
6. Submetacentric medium
7. Metacentric medium
8. Submetacentric medium
9. Submetacentric small
10. Submetacentric small
11. Metacentric small

Fig. 2: Idiograph of the chromosome of *A. zenkeri*. The nineth pair is the satellited chromosome



LEGEND

1. Acrocentric Large
2. Submetacentric large
3. Submetacentric medium
4. Submetacentric medium
5. Submetacentric medium
6. Submetacentric medium
7. Submetacentric medium
8. Metacentric small
9. Metacentric small
10. Submetacentric small
11. Metacentric small

Fig. 3: Idiograph of the chromosome of *A. talbotii*. The eleventh pair carry the satellite.

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