Bothalia 17,2: 257–259 (1987)

Miscellaneous notes

VARIOUS AUTHORS

CHROMOSOME STUDIES ON AFRICAN PLANTS. 5.

The presentation of chromosome numbers in this report conforms with the format described in the first publications in this series (Spies & Du Plessis 1986a & b, 1987; Spies & Jonker 1987).

POACEAE

Aristideae

Aristida adscensionis L. subsp. *guineensis* (Trin. & Rupr.) Henr.: **n = 33.**

CAPE. — 2917 (Springbok): 71 km from Port Nolloth to Steinkopf (–AD), *Spies 2828.*

Eragrostideae

Fingerhuthia africana Lehm.: **n = 20.**

CAPE. — 2924 (Hopetown): 16 km from Griekwastad to Kimberley (–CD), *Spies 2678.*

Eragrostis echinochloidea Stapf: **n = 20, 30.**

CAPE. — 2822 (Glen Lyon): 93 km from Groblershoop to Kimberley (–DC), *Spies 2869* (n = 30). 2823 (Griekwastad): 16 km from Griekwastad to Kimberley (–CD), *Spies 2887* (n = 20). 2924 (Hopetown): 17 km from Heuningneskloof to Hopetown (–AD), *Spies 2691* (n = 20).

Eragrostis lehmanniana Nees: **n = 20.**

CAPE. — 2823 (Griekwastad): 123 km from Groblershoop to Kimberley (–CC), *Spies 2883.*

Eragrostis × *pseud-obtusa* De Winter: **n = 20, 40.**

CAPE. — 2822 (Glen Lyon); 93 km from Groblershoop to Kimberley (–DC), *Spies 2870* (n = 20). 2923 (Douglas): 65 km from Hopetown to Strydenburg (–DC), *Spies 2713* (n = 40).

Cynodonteae

Chloris virgata Swartz: **n = 20.**

CAPE. — 2924 (Hopetown): 17 km from Heuningneskloof to Hopetown (–AD), *Spies 2679.*

Andropogoneae

Bothriochloa insculpta (A. Rich.) A. Camus: **n = ~60.**

TRANSVAAL. — 2430 (Pilgrim's Rest): 23 km from Boshoek to Olifantshoek (–CD), *Spies 1543.*

Ischaemum afrum (J. F. Gmel.) Dandy: **n = 10.**

TRANSVAAL. — 2428 (Nylstroom): 10 km from Warmbaths to Pretoria (–CD), *Spies 2048.* 2528 (Pretoria): near Turfpan (–AB), *Spies 2053.*

Ischaemum fasciculatum Brongn.: **n = 10.**

TRANSVAAL. — 2528 (Pretoria): near Turfpan (–AB), *Spies 2052.*

Sehima galpinii Stent: **n = 40.**

TRANSVAAL. — 2528 (Pretoria): near Turfpan (–AB), *Spies 2056.*

Cymbopogon excavatus (Hochst.) Stapf ex Burtt Davy: **n = 10, 20.**

TRANSVAAL. — 2528 (Pretoria): 35 km from Warmbaths to Pretoria (–AB), *Spies 2044* (n = 10); near De Tweedespruit turn-off on road between Cullinan and Sybrandskraal (–DA), *Spies 2109* (n = 20).

Cymbopogon validus (Stapf) Stapf ex Burtt Davy: **n = 10.**

TRANSVAAL. — 2528 (Pretoria): 1 km from Cullinan to Pretoria (–DA), *Spies 2093.*

Schizachyrium sanguineum (Retz.) Alst.: **n = 20.**

TRANSVAAL. — 2528 (Pretoria): near Donkerhoek (–CD), *Spies 2070.*

Hyparrhenia filipendula (Hochst.) Stapf var. *pilosa* (Hochst.) Stapf: **n = 10, 20.**

TRANSVAAL. — 2528 (Pretoria): near Elands River on road between Cullinan and Sybrandskraal (–DA), *Spies 2100* (n = 10); near Klipspruit (–DA), *Spies 2121* (n = 20).

Hyparrhenia tamba (Steud.) Stapf: **n = 20.**

TRANSVAAL. — 2528 (Pretoria): near Sphinx Station (–CA), *Spies 2019.*

Heteropogon contortus (L.) Roem. & Schult.: **n = 20, 28.**

TRANSVAAL. — 2528 (Pretoria): 1 km from Cullinan to Pretoria (–DA), *Spies 2097* (n = 28). 2530 (Lydenburg): near Goede Hoop (–AC), *Spies 1581a* (n = 20).

Paniceae

Digitaria monodactyla (Nees) Stapf: **n = 9.**

TRANSVAAL. — 2430 (Pilgrim's Rest): Blyderivierspoort Nature Reserve (–DB), *Spies 1427.*

Urochloa brachyura (Hack.) Stapf: **n = 18.**

TRANSVAAL. — 2528 (Pretoria): near Sphinx Station (–CA), *Spies 2013.*

Urochloa mosambicensis (Hack.) Dandy: **n = 14.**

TRANSVAAL. — 2528 (Pretoria): 35 km from Warmbaths to Pretoria (–AB), *Spies 2040.*

Panicum coloratum L. var. *coloratum:* **n = 9.**

TRANSVAAL. — 2528 (Pretoria): 35 km from Warmbaths to Pretoria (–AB), *Spies 2036.*

Brachiaria brizantha (A. Rich.) Stapf: **n = 27.**

TRANSVAAL. — 2528 (Pretoria): near Klipspruit (–DA), *Spies 2120.*

Setaria megaphylla (Steud.) Dur. & Schinz: **n = 27.**

TRANSVAAL. — 2528 (Pretoria): near Pienaars River on road between Pretoria and Bronkhorstspruit (–DA), *Spies 2065.*

Cenchrus ciliaris L.: **n = 16.**

TRANSVAAL. — 2528 (Pretoria): near Pienaars River on road between Pretoria and Warmbaths (–AD), *Spies 2034.*

Rhynchelytrum repens (Willd.) C. E. Hubb.: **n = 18.**

TRANSVAAL. — 2530 (Lydenburg): 41 km from Lydenburg to Roossenekal (–AA), *Spies 1591*; 15 km from Dullstroom to Goede Hoop (–AC), *Spies 1448a.*

Agrostideae

Agrostis lachnantha Nees var. *lachnantha:* **n = 28.**

TRANSVAAL. — 2528 (Pretoria): near Pienaars River on road between Pretoria and Bronkhorstspruit (–DA), *Spies 2058.*

Aveneae

Koeleria capensis (Steud.) Nees: **n = 14.**

TRANSVAAL. — 2530 (Lydenburg): near Frischgewaagd (–AC), *Spies 1565a.*

DISCUSSION

The basic chromosome numbers presented in this article conform, in most instances, to published results for the same species, or for other species of the genus (Darlington & Wylie 1955; Ornduff 1967–1969; Fedorov 1969; Moore, R. J. 1970–1977; Moore, D. M. 1982; Goldblatt 1981–1985).

Deviations from the expected chromosome numbers were observed in three species. The somatic chromosome number of 2n = 28 observed for *Spies 2040, Urochloa mosambicensis,* represents a basic chromosome number of seven, contrary to the expected number of nine for the tribe Paniceae. Various deviations from the expected basic number of nine seem to dominate chromosome counts in the genus *Urochloa.* Somatic chromosome numbers based on 7, 8, 9, 10, 12, 13 and 23 have been reported, with the numbers based on seven and nine being the most frequent (Darlington & Wylie 1955; Ornduff 1967–1969; Fedorov 1969; Moore, R. J. 1970–1977; Moore, D. M. 1982; Goldblatt 1981–1985). The same variation is observed in *U. mosambicensis,* where reported chromosome numbers include somatic numbers of 14 (Davidse, Hoshino & Simon 1986), 28 (Nath & Swaminathan 1957; Raman, Chandrasekharan & Krishnaswami 1959; Nath, Swaminathan & Mehra 1970; current study), 30 (De Wet & Anderson 1956), 40 (Pritchard 1970) and 42 (Moffett & Hurcombe 1949). This study indicated that all meiotic stages were normal and, therefore, aneuploidy is not expected in plants with a basic chromosome number of seven.

The second specimen with a chromosome number deviating from the expected number is a *Cenchrus ciliaris* specimen, *Spies 2034,* with 2n = 32. However, *C. ciliaris* is a known aneuploid species and somatic chromosome numbers of 29, 32, 34, 36, 38, 40, 42, 44, 45, 52, 54, 56 and 78 have been described (Donald 1953; Darlington & Wylie 1955; Jogindernath & Swaminathan 1957; Patil, Vohra & Joshi 1961; Ornduff 1967–1969; Fedorov 1969; Jagannath & Raman 1974; Moore, R. J. 1970–1977; Moore, D. M. 1982; Goldblatt 1981–1985; Spies and Du Plessis 1986b & 1987). This aneuploid series of chromosome numbers is not restricted to this species. The genus *Cenchrus* has chromosome numbers of 30, 32, 34, 35, 36, 37, 38, 40, 42, 44, 45, 52, 54, 56, 66, 68, 70 and 78, with 34 and 36 being the most common (Darlington & Wylie 1955; Ornduff 1967–1969; Fedorov 1969; Moore, R. J. 1970–1977; Moore, D. M. 1982; Goldblatt 1981–1985).

The third species with a chromosome number deviating from the expected number is a *Heteropogon contortus* specimen, *Spies 2097,* with a somatic chromosome number of 56. This is the second *H. contortus* specimen with an aneuploid chromosome number observed during this series. The previous specimen had a somatic number of 46 (Spies & Du Plessis 1986a). Further investigations into the extent of aneuploidy and modes of reproduction of such plants are planned.

Meiotic chromosome pairing was abnormal in a significant number of the specimens studied. Abnormalities were observed in the following species:

1, *Ischaemum afrum,* where nil to four chromosome laggards were observed during anaphase I. Micronuclei were observed during telophase II in the same specimen, *Spies 2048*;

2, *Hyparrhenia filipendula* var. *pilosa, Spies 2100,* which is a diploid specimen (2n = 20), has a very abnormal meiosis. Between 50% and 60% of metaphase I cells have at least one univalent. The number of univalents varied from nil to four and the chromosome configurations varied from $4_I\ 8_{II}$ to $1_I\ 8_{II}\ 1_{III}$. During anaphase I one to four univalents per cell were present. In the tetraploid (2n = 40) specimen, *Spies 2121,* six univalents were observed in each cell. However, the occurrence of these univalents did not result in any laggards or any other abnormalities;

3, *Hyparrhenia tamba.* Meiotic chromosome behaviour was very abnormal in the tetraploid (2n = 40) specimen studied, *Spies 2019.* During metaphase I chromosome configurations varied from 20_{II} to $6_{II}\ 7_{IV}$, with a $14_{II}\ 3_{IV}$ configuration being the most frequent one. The high multivalent frequency indicates a possible autoploid origin for this specimen. However, an insufficient number of cells have been studied to determine the type of ploidy origin in this specimen according to the available statistical methods (Kimber & Alonso 1981; Spies 1984). The high frequency of multivalent formation resulted in abnormal chromosome segregation during anaphase I where it varied from normal to a 16:24 segregation;

4, *Heteropogon contortus.* The aneuploid (2n = 56) specimen, *Spies 2097,* had two to four univalents during metaphase I, as well as up to four laggards during anaphase I. Chromosome configurations during diakineses varied from 28_{II} to $6_I\ 25_{II}$;

5, *Digitaria monodactyla.* This is another example of abnormal chromosome behaviour in a diploid (2n = 18) specimen. Occasionally up to three laggards were observed during anaphase I.

Another interesting observation during this study was the fact that a *Bothriochloa insculpta* specimen, *Spies 1543,* with a very high chromosome number (2n = ~120), had a very normal meiosis with no abnormalities.

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