



Studies on the genus *Setaria* Viborg, 1795 in South Africa. I. *Setaria africana* (Yeh, 1959)

R. WATERMEYER¹, J. BOOMKER¹ and J.F. PUTTERILL²

ABSTRACT

WATERMEYER, R., BOOMKER, J. & PUTTERILL, J.F. 2000. Studies on the genus *Setaria* Viborg, 1795 in South Africa. I. *Setaria africana* (Yeh, 1959). *Onderstepoort Journal of Veterinary Research*, 67:229–234

Setaria africana (Yeh, 1959) is represented by two subspecies, *Setaria africana africana* Troncy, Graber & Thal, 1976 from giant eland (*Taurotragus derbianus*) from the Central African Republic and Cameroon and *Setaria africana farchai* Troncy, Graber & Thal, 1976 from bushbuck (*Tragelaphus scriptus*), also from the Central African Republic. Material collected from nyala (*Tragelaphus angasii*), bushbuck and kudu (*Tragelaphus strepsiceros*) from several localities in the eastern region of South Africa was re-examined. Measurements of adult worms confirmed the differences between the two subspecies and scanning electron microscopy showed that the deirids of *S. africana africana* are single whereas those of *S. africana farchai* are double. *Setaria africana farchai* is recorded for the first time in South Africa.

Keywords: Helminth parasites, *Setaria africana*, *Setaria africana farchai*, South African wildlife

INTRODUCTION

The genus *Setaria* Viborg, 1795 is wide-spread and in Africa it occurs in equids, suids, hyracoids and ruminants (Round 1968). Yeh (1959) divided the genus *Setaria* into the genera *Setaria*, *Hyaconema* and *Artionema*, and described *Artionema africana* from, amongst others, nyala (*Tragelaphus angasii*) from KwaZulu-Natal. However, Nelson (1962) and Round (1968) did not accept this division. Ortlepp (1964) also rejected the genus *Artionema* and placed *Artionema hartwichi* Yeh, 1959 and *Artionema africana* Yeh, 1959 in the genus *Setaria*. Chabaud (1965) and Desset (1966) treated Yeh's (1959) divisions as subgenera while Anderson & Bain (1976)

consider *Hyaconema* and *Artionema* as synonyms of *Setaria*.

During several surveys of the helminth parasites of South African wildlife, many specimens of the genus *Setaria* were collected from a variety of hosts, including kudu (*Tragelaphus strepsiceros*), nyala and bushbuck (*Tragelaphus scriptus*) (Boomker, Keep, Flamand & Horak 1984; Boomker, Horak & De Vos 1989; Boomker, Horak & Flamand 1991). *Setaria africana* was recovered from bushbuck, but the specimens from kudu and nyala were identified to the genus level only (Boomker *et al.* 1984, 1989, 1991). Ortlepp (1961) recorded the presence of *S. africana* in kudu and bushbuck and Troncy, Graber & Thal (1976) described *Setaria africana africana* and *Setaria africana farchai* from the abdominal cavities of the giant eland (*Taurotragus derbianus*) and bushbuck, respectively. The material from the South African hosts was re-examined, and the scanning electron microscopic appearance together with the measurements of the two subspecies of *S. africana* are presented here and compared with the findings of Yeh (1959) and Troncy *et al.* (1976).

¹ Department of Veterinary Tropical Diseases, University of Pretoria, Private Bag X04, Onderstepoort, 0110 South Africa

² Division of Pathology, Electron Microscope Unit, Onderstepoort Veterinary Institute, Private Bag X05, Onderstepoort, 0110 South Africa

MATERIALS AND METHODS

The specimens originated from the helminthological collection of one of us (JB), currently housed in the Department of Veterinary Tropical Diseases, University of Pretoria, and the following specimens were examined: one female from kudu, Pafuri, Kruger National Park (KNP); four males and 11 females from nyala in the Mkuzi Game Reserve, KwaZulu-Natal (KZN); two females from nyala in the Umfolozi Game Reserve, KZN; 22 males and 81 females from nyala in the Ndumu Game Reserve, KZN; one female from bushbuck from Pretoriusskop, KNP; three females from bushbuck in the Weza Forest Nature Reserve, KZN and one female from bushbuck at Charters Creek, KZN.

The nematodes were cleared in lactophenol and examined under a compound microscope with Nomarski's interference contrast lighting. Drawings were made with the aid of a drawing tube. Measurements were derived from the drawings and all are given in millimetres (mm). With the exception of the extensive collection from nyala, from which ten males and ten females were selected and measured, all the material was measured.

Specimens for scanning microscopy were dehydrated through graded ethyl alcohol and critically point dried from 100 % ethanol to liquid carbon dioxide. They were mounted on stubs and sputter-coated with gold. The examinations and photography were done with a Hitachi S-2500 scanning electron microscope operated at 8 kV.

RESULTS AND DISCUSSION

Of the 126 helminths examined, 121 proved to be *S. africana africana*. One female was recovered from kudu at Pafuri, four males and 11 females from nyala in the Mkuzi Game Reserve, two females from the same host in the Umfolozi Game Reserve and 22 males and 81 females from nyala in the Ndumu Game Reserve. These localities represent the northern part of the KNP and the northern game reserves of KZN. A total of five nematodes, one female from bushbuck at Pretoriusskop, KNP, three females from the same host in the Weza Forest and one female from bushbuck at Charters Creek, in the central part of KZN, proved to be *S. africana farchai*.

In Tables 1 and 2 the measurements of *S. africana africana* and *S. africana farchai* are compared with those made by Yeh (1959) and Troncy *et al.* (1976), respectively.

Desset (1966) found little difference between her *S. africana* material and that of Yeh (1959), and the measurements of the South African material also correspond well with those of Yeh (1959).

The majority of measurements of the South African *S. africana farchai* were similar to those recorded by Troncy *et al.* (1976). However, the cephalic elevations are larger and approach the measurements of those of *S. africana africana*. The oesophagus is also longer, the shortest measurements being well in excess of those given by Troncy *et al.* (1976). The caudal appendages are bigger and nearer the tail tip.

TABLE 1 Comparative measurements (in mm) of *Setaria africana africana*

| Criterion | Males | | Females | | |
|--|------------------------|-------------|----------------------|------------------------|-------------|
| | This paper | Yeh (1959) | This paper | This paper | Yeh (1959) |
| | Nyala (<i>n</i> = 10) | | Kudu (<i>n</i> = 1) | Nyala (<i>n</i> = 10) | |
| Length | 32,00–46,00 | 31,00–46,00 | 72,00 | 61,00–90,00 | 44,00–94,00 |
| Width | 0,320–0,380 | 0,270–0,350 | 0,690 | 0,490–0,650 | 0,500–0,700 |
| Muscular oesophagus length | 0,340–0,650 | 0,400–0,700 | 0,680 | 0,460–0,870 | 0,400–0,700 |
| Glandular oesophagus length | 4,790–6,450 | 3,500–6,200 | 7,620 | 5,920–8,470 | 4,500–8,400 |
| Total oesophagus length | 5,300–7,100 | 4,000–7,000 | 8,300 | 6,500–9,100 | 5,000–9,000 |
| Nerve ring from anterior end | 0,170–0,250 | 0,200–0,270 | 0,240 | 0,200–0,280 | 0,200–0,300 |
| Deirids from anterior end | 0,270–0,490 | 0,320–0,650 | 0,440 | 0,420–0,630 | 0,400–0,500 |
| Vulva distance from anterior end | – | – | 0,540 | 0,450–0,620 | 0,400–0,600 |
| Tail, length | 0,160–0,240 | 0,160–0,180 | 0,358 | 0,350–0,610 | 0,400–0,600 |
| Caudal appendages from tail tip | – | – | 0,046 | 0,063–0,104 | 0,060–0,080 |
| Caudal appendages length | – | – | 0,015 | 0,011–0,017 | 0,011 |
| Right spicule, length | 0,070–0,100 | 0,110–0,130 | – | – | – |
| Left spicule shaft, length | 0,170–0,200 | 0,170–0,190 | – | – | – |
| Left spicule blade, length | 0,070–0,090 | 0,080–0,110 | – | – | – |
| Distance between cephalic elevations, lateral view | 0,070–0,110 | 0,080–0,100 | 0,130 | 0,110–0,160 | 0,130–0,170 |
| Distance between cephalic elevations, ventral view | 0,020–0,030 | # | 0,050 | 0,030–0,040 | 0,050 |

– Not applicable

Measurements not given by author

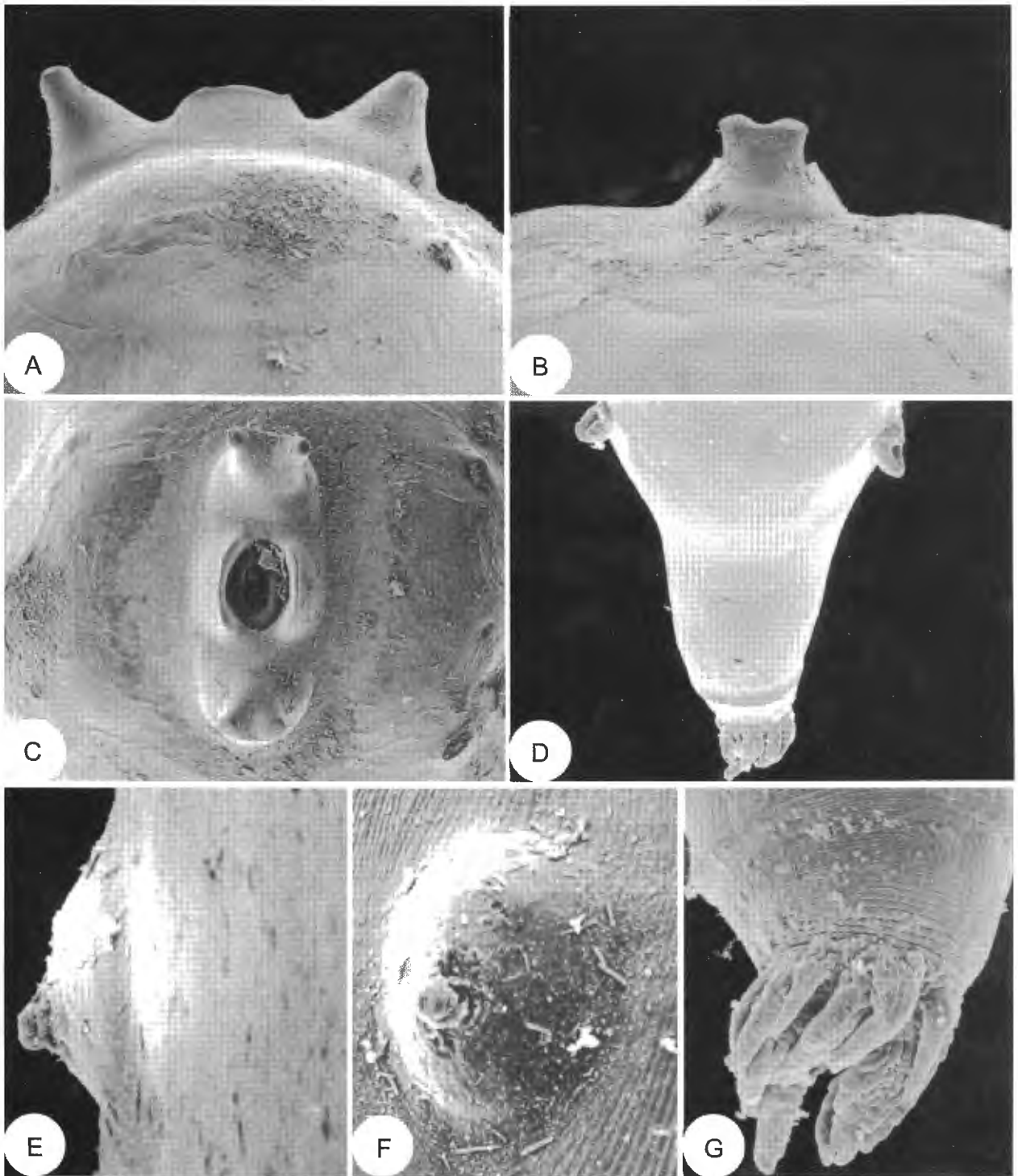


FIG. 1 *Setaria africana africana*

- A Lateral view of cephalic elevations, x 600
- B Ventral view of elevations, x 600
- C *En face* view of elevations, x 500
- D Ventral view of female tail, x 1000
- E Lateral view of deirid, x 3000
- F *En face* view of deirid, x 3000
- G Terminal part of female tail, x 3000

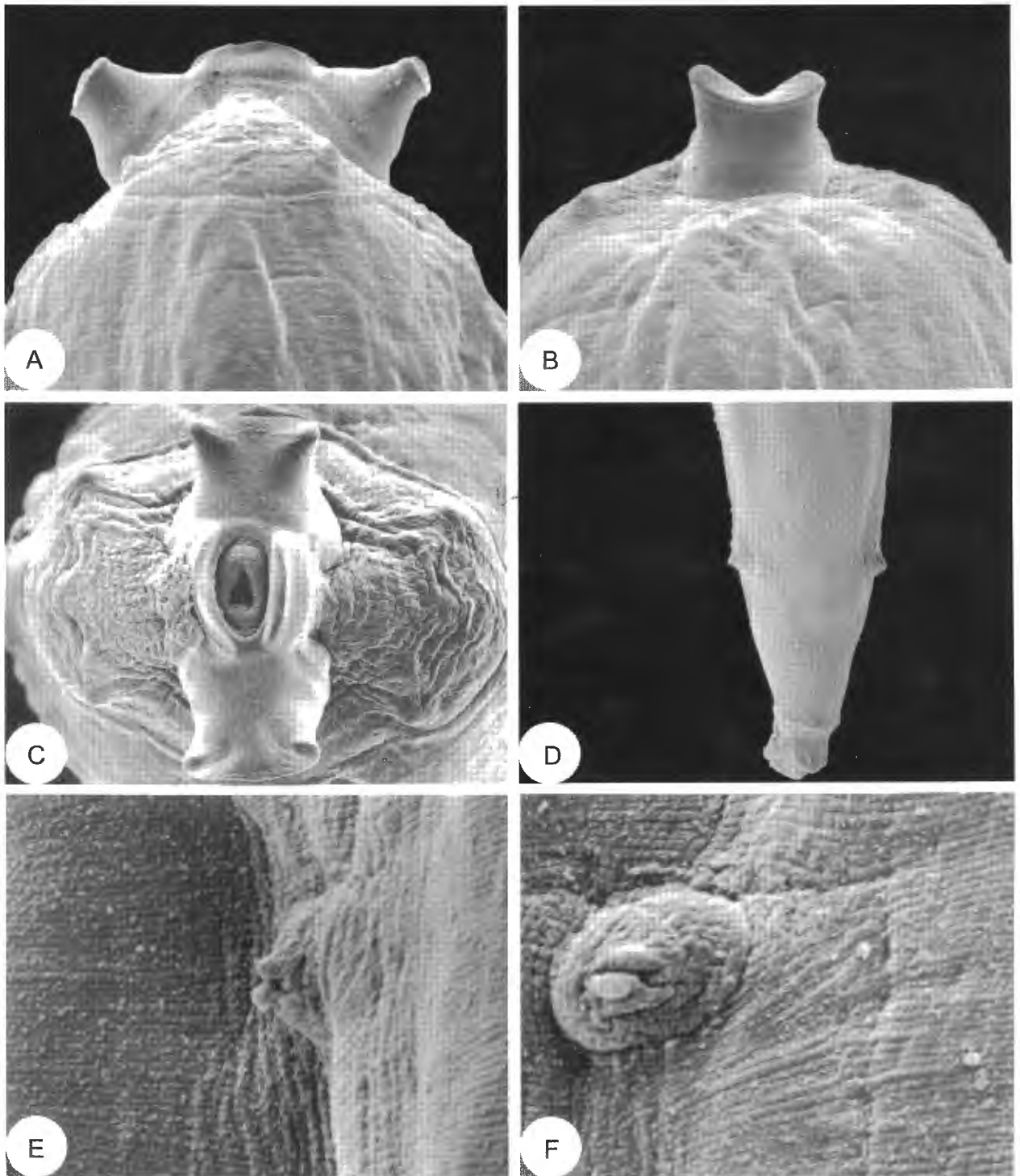


FIG. 2 *Setaria africana farchai*

- A Lateral view of cephalic elevations, x 600
- B Ventral view of elevations, x 600
- C *En face* view of elevations, x 600
- D Ventral view of female tail, x 1000
- E Lateral view of deirid, x 3000
- F *En face* view of deirid, x 3000

TABLE 2 Comparative measurements (in mm) of *Setaria africana farchai* females from bushbuck (*Tragelaphus scriptus*)

| Criterion | Females | | |
|--|-------------|-----------|-----------------------------|
| | This paper | | Troncy <i>et al.</i> (1976) |
| | Range | Mean # | Range |
| Length | 63,00–83,00 | 77,50 | 80,00 |
| Width | 0,350–0,630 | 0,510 | 0,600 |
| Muscular oesophagus, length | 0,400–0,970 | 0,750 | 0,660 |
| Glandular oesophagus, length | 5,330–7,420 | 6,130 | 4,440 |
| Total oesophagus, length | 6,300–7,820 | 6,880 | 5,100 |
| Nerve ring from anterior end | 0,220–0,290 | 0,270 | 0,260 |
| Deirids from anterior end | 0,400–0,550 | 0,490 | 0,560 |
| Vulva from anterior end | 0,460–0,580 | 0,530 | 0,570 |
| Tail, length | 0,320–0,670 | 0,510 | 0,630 |
| Caudal appendages from tail tip | 0,058–0,081 | 0,069 | 0,110 |
| Length of right caudal appendage in ventral view | 0,019 | 0,019 | 0,015* |
| Length of left caudal appendage in ventral view | 0,017 | 0,017 | 0,008* |
| Distance between cephalic elevations, lateral view | 0,097–0,173 | 0,134 | 0,104 |
| Distance between cephalic elevations, ventral view | 0,039–0,046 | 0,043 | 0,017 |

* Orientation of specimens not indicated

In addition, they are almost equal in length in the South African material whereas Troncy *et al.* (1976) found them to be unequal.

The scanning electron microscopical appearance of the two *S. africana* subspecies are presented in Fig. 1 and 2.

It is evident from the scanning electron micrographs that the description of Troncy *et al.* (1976) is accurate. However, they do not mention the deirids which in all specimens of *S. africana africana* examined are single and situated on a large promontory (Fig. 1E and 1F), whereas those of *S. africana farchai* are double and occur on a much smaller promontory (Fig. 2E and 2F). In addition, the peri-buccal crown of *S. africana africana* is more rectangular in shape than that of *S. africana farchai* which is spindle-shaped. The caudal extremities of female *S. africana africana* bear numerous rounded tubercles whereas those of *S. africana farchai* carry six to eight pointed tubercles.

Setaria africana was described from nyala but has also been recorded from bushbuck (Yeh 1959; Ortlepp 1961; Desset 1966; Roth & Dalchow 1967), kudu (Ortlepp 1961; Roth & Dalchow 1967) and giant eland (Sachs & Sachs 1968). Desset (1966) describes the deirids of *S. africana africana* from bushbuck as being single, but since the division is very difficult to see under a light microscope she might have examined *S. africana farchai*. The records of Ortlepp (1961) and of Roth & Dalchow (1967) from bushbuck could also be *S. africana farchai* but their records from kudu were in all probability *S. africana africana*. However, definitive conclusions cannot be made since the material of Desset (1966), Ortlepp (1961) and Roth & Dalchow (1967) was unavailable.

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