

## Studies in Cyperaceae in southern Africa

17: An examination of *Schoenoplectus muricinux* (C.B. Cl.) J. Raynal *sensu lato*

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Herbarium material of the sub-tropical and southern African species, *Schoenoplectus muricinux* (C.B. Cl.) J. Raynal *sensu lato* was found to comprise three different entities. Two of these are *Schoenoplectus muricinux sensu stricto* and *Schoenoplectus muriculatus* (Kuekenth.) J. Browning comb. nov., syn. *Scirpus muriculatus* Kuekenth. The third, with a distribution restricted to the geographic area of Maputaland, Natal, is *Schoenoplectus confusus* (N.E. Br.) K. Lye subsp. *natalitius* J. Browning (subsp. nov.). The new subspecies is established on the basis of morphological differences from the typical subspecies and its two varieties. *Schoenoplectus confusus* has not previously been recorded for southern Africa. A key to identification, formal descriptions, distribution maps and illustrations are provided for the two species and one subspecies in southern Africa. *Schoenoplectus muricinux s.l.* is briefly surveyed in sub-tropical Africa.

Herbariummateriaal van die subtropiese en suider-Afrikaanse spesie, *Schoenoplectus muricinux* (C.B. Cl.) J. Raynal *sensu lato* het getoon dat dit uit 'n kompleks van drie onderskeibare entiteite bestaan. Twee van die entiteite is *Schoenoplectus muricinux sensu stricto* en *Schoenoplectus muriculatus* (Kuekenth.) J. Browning comb. nov., syn. *Scirpus muriculatus* Kuekenth. Die derde, met 'n verspreiding wat beperk is tot die geografiese gebied van Maputaland, Natal, is *Schoenoplectus confusus* (N.E. Br.) K. Lye subsp. *natalitius* J. Browning (subsp. nov.). Die nuwe subspesie is daargestel om die morfologiese verskille van die tipiese subspesie en die twee variëteite aan te toon. *Schoenoplectus confusus* is nog nie voorheen vir suider-Afrika genoteer nie. 'n Sleutel tot identifikasie, formele beskrywings, verspreidingskaarte en illustrasies is ingesluit vir die twee spesies en een subspesie wat in suider-Afrika gevind word. 'n Kort oorsig van *Schoenoplectus muricinux s.l.* in sub-tropiese Afrika is ingesluit.

**Keywords:** *Schoenoplectus muricinux s.l.*, taxonomy, southern Africa.

## Introduction

In 1898, when Clarke circumscribed *Scirpus paludicola* Kunth for southern Africa, he cited a specimen (*Buchanan 163*) from the Orange Free State. Later *Buchanan 163* was made a syntype (together with *Eyles 1202* from Rhodesia) of a new species, *Scirpus muricinux* C.B. Cl. (Clarke, 1906). The new species differed from *Scirpus paludicola* mainly in the absence of hypogynous bristles and in the transversely wavy surface of the achene. A brief description mentioned its pale ('albida') inflorescence.

Lye (1971) and Raynal (1976) resuscitated *Schoenoplectus* (Reichenbach) Palla. *Schoenoplectus muricinux* (C.B. Cl.) J. Raynal became the new combination for Clarke's taxon. Raynal suggested that the species was perhaps not distinct from *S. confusus* (N.E. Br.) K. Lye. The well-defined transverse ridges extending over the shoulders of the achene and the number of these ridges to an achene face were linking characters.

Haines and Lye (1983), when circumscribing *Schoenoplectus muricinux* for Zambia and Zimbabwe, noted: 'This species is closely related to *S. confusus* but has smaller glumes and nutlets. Also the nutlets are less triangular since they are relatively narrower.'

Kuekenthal (1934) established *Scirpus muriculatus* (Type: Rhodesia, *Fries, Norlindh & Weimark 2137*). He described the achenes as strongly wavy ('... valde transversim muriculato-rugosa ...'), in contrast to the smooth achenes of

*Scirpus corymbosus* Roth, from which taxon he differentiated his new species, being unaware, it would seem, of Clarke's *S. muricinux*. Little attention has been paid to Kuekenthal's species. In consequence, despite a different facies and darker brown coloration of the inflorescence, but due to the transversely-ridged achene, plants agreeing with the description of *S. muriculatus* have frequently been included within *Schoenoplectus muricinux s.l.*, with no infraspecific status established to mark the differences. However, notes on herbarium sheets make occasional reference to 'dark' and 'light' elements within *S. muricinux* and there has sometimes been selective sorting of specimens in herbaria, both of which suggest that the heterogeneity has not been entirely unnoticed.

In an attempt to clarify *Schoenoplectus muricinux sensu lato*, a full range of herbarium material from southern Africa and Zimbabwe was examined. An investigation of plants in the field was also carried out. The results of this study are presented in this paper.

## Materials and Methods

Material from South African herbaria was studied, as well as specimens from the Government Herbarium, Harare, Zimbabwe (SRGH). Other herbaria kindly loaned type and other relevant specimens and provided photostats. Over 200 specimens were examined. Relevant qualitative and quantitative morphological characters were investigated. Growth form,

habitat preference and distribution were recorded.

Light and scanning electron microscopy were employed in the study of micromorphological features.

## Results and Discussion

Studies indicated that in southern Africa *Schoenoplectus muricinux sensu lato* may be divided into three entities. Table 1 summarizes their main criteria.

### Entity 1 (Figure 1)

This entity comprised tall plants with thick culms. The ligules were well developed (Figure 4A). Glumes were pale yellowish-white overlaid near the apex by a distinct brownish-black inverted V, or by patches of dark colour on either side of a pallid or green keel. The ridges of the achene (12 – 16 per face) were well developed (see Figure 5). Representative examples were found to be conspecific with the lectotype (K) and isotype (SRGH) of *Scirpus muricinux* (Rhodesia: Eyles 1202). This entity can now be regarded as synonymous with *Schoenoplectus muricinux* (C.B. Cl.) J. Raynal *sensu stricto*. It differs from *S. confusus* var. *confusus* (Type: Ethiopia, Schimper 253) in dimensions of ligule, glume, anther, style and achene width.

### Entity 2 (Figure 2)

This entity comprised shorter plants, with thinner culms and ligules half the height of those of Entity 1 (Figure 4B). Glumes were chestnut-brown, sometimes overlaid towards the apex with a distinct darker brown inverted V, its arms extending on either side of a pallid or green keel. The ridges of the achenes (8 – 10 per face) varied in development (see Figure 6).

The holotype of *Scirpus muriculatus* (Rhodesia: Fries,

Norlindh & Weimarck 2137, LD) fitted within parameters recorded for Entity 2. Kuekenenthal (1934) described the achene of this holotype as strongly transversely ridged in comparison with the smooth achenes of *Scirpus corymbosus* Roth, but electron micrographs have shown the ridges to be of only moderate amplitude [see Figures 6(g) and 6(j)] and well within the range for Entity 2. Entity 2 is therefore accepted as being synonymous with *Scirpus muriculatus* Kuekenenthal. This species is given the new combination *Schoenoplectus muriculatus* (Kuekenent.) J. Browning in the section on formal taxonomy.

### Entity 3 (Figure 3)

The glume coloration, but not the glume dimensions, of this entity resembled those of Entity 1. The height of the ligule was comparable with that of Entity 2. Table 1 shows that in lengths of glume, anther, style and stigmatic branches, Entity 3 differs from Entity 1 and Entity 2.

On measured parameters, Entity 3 is most closely affiliated with *Schoenoplectus confusus* (N.E. Br.) K. Lye var. *confusus*. Differences between the former and the latter are given in the section on formal taxonomy. On the basis of the discontinuities recorded, Entity 3 is regarded as distinct from both Entity 1 and Entity 2 and is assigned formal taxonomic status as *Schoenoplectus confusus* (N.E. Br.) K. Lye subsp. *natalitius* J. Browning (subsp. nov.).

### *Schoenoplectus muricinux* s.l. in sub-tropical Africa

Material borrowed from Zimbabwe (SRGH) was critically examined to supplement the study of southern African specimens. This revealed the paucity of collections (perhaps

**Table 1** The more important qualitative and quantitative parameters representative of *Schoenoplectus muricinux* s.s., *S. muriculatus*, *S. confusus* subsp. *natalitius* and *S. paludicola*<sup>a</sup>

	Entity 1 <i>Schoenoplectus muricinux</i> s.s.	Entity 2 <i>Schoenoplectus muriculatus</i>	Entity 3 <i>Schoenoplectus confusus</i> subsp. <i>natalitius</i>	<i>Schoenoplectus paludicola</i>
Plant height	(130–)210–950	(200–)300–400(–750)	430–1100	240–750
Overtopping bract length	40–150	20–80	20–90	40–100
Culm diameter (10 mm below infl.)	1.5–3.6	1.0–2.0*	2.0–3.5	2.0–3.0
Culm texture (dry material)	soft compressible	hard firm	soft compressible	hard firm
Ligule height	1.0–1.8*	0.3–0.5	0.5–0.8	0.3–0.5
Glume length	1.8–2.6 (2.3±0.178)	2.3–2.6 (2.4±0.116)	2.4–3.4* (2.8±0.3)	1.9–2.8 (2.3±0.129)
Achene length	1.2–1.6 (1.3±0.093)	1.2–1.6 (1.4±0.086)	1.1–1.5 (1.3±0.12)	1.3–1.7 (1.4±0.068)
Achene width	0.9–1.2 (1.0±0.078)	0.9–1.2 (1.0±0.086)	1.0–1.1 (1.0±0.074)	0.8–1.2 (0.9±0.076)
Anther and crest length	0.4–0.7 (0.5±0.089)	0.4–0.6 (0.5±0.047)	0.9–1.3 (1.1±0.13)*	0.4–0.6 (0.5±0.05)
Style length	0.5–0.8 (0.7±0.09)	0.5–1.0 (0.6±0.12)	0.8–2.0* (1.3±0.4)	0.6–1.3 (0.8±0.16)
Stigmatic branch length	1.0–1.5 (1.3±0.14)	1.0–1.5 (1.3±0.17)	1.3–2.3* (1.6±0.3)	0.6–1.3 (1.1±0.12)

<sup>a</sup> All measurements are in millimetres. Parameters discontinuous from those of the remainder of the complex are marked by an asterisk. Note: Extremes record maximum and minimum parameters for all complete specimens studied; means and standard deviations from the means were derived from 20 specimens taken at random through the distributional range.

because plants grow in habitats where infection by Bilharzia parasites is a reality). There is considerable variation in facies of the collected plants. This is reflected in the names that have been applied by previous workers, who obviously found difficulty in identification and delimitation of species. In reappraisal some specimens were confidently referred to *Schoenoplectus muricinix* s.s.; others to *Schoenoplectus muriculatus* (there were twice as many specimens of the former compared with the latter, which was the numerical relationship observed for the southern African material examined). The distribution of these specimens is recorded in Figure 8. It should be noted that both *S. muricinix* s.s. and *S. muriculatus* are based on types from Rhodesia (Zimbabwe). Both species appear to be less common in subtropical Africa than in southern Africa, but this could be a phenomenon of inadequate collecting.

### Formal taxonomy

#### Key to identification

- 1a Achenes smooth; bristles present, 5 – 6 in number .....  
 ..... *Schoenoplectus paludicola*  
 (for treatment of this species see Browning, 1990).
- 1b Achenes transversely wavy; bristles absent, or if present,  
 fewer than 5 – 6 in number ..... 2
- 2a Glumes brown (not pallid except on keel) overlaid distally by  
 a darker brown inverted V on either side of the pallid keel;  
 ligule of uppermost leaf sheath 0.2 – 0.6 mm in height; dry  
 culms, 10 mm below inflorescence, 1.0 – 2.0 mm in diameter  
 ..... 2. *Schoenoplectus muriculatus*
- 2b Glumes pallid, straw-coloured or pale green, with distally a  
 dark brown-blackish inverted V on either side of the keel;  
 ligule of uppermost leaf sheath 0.5 – 1.8 mm (usually  
 exceeding 0.6 mm) in height; dry culms, 10 mm below  
 inflorescence, 1.5 – 3.5 mm in diameter (usually some, or  
 more often the majority, exceeding 2 mm) ..... 3
- 3a Glumes 1.8 – 2.6 mm in length (usually uniform above the  
 basal smaller ones, the apical apiculus well marked but not  
 long attenuate); anther and crest 0.4 – 0.7 mm long; style  
 usually less than 0.8 mm long, stigmatic branches not exceed-  
 ing 1.5 mm long (widespread) .....  
 ..... 1. *Schoenoplectus muricinix* s.s.
- 3b Glumes 2.4 – 3.4 mm in length (often irregularly sized above  
 the basal smaller ones, the apical apiculus often long  
 attenuate); anther and crest 0.9 – 1.3 mm long; style length  
 usually exceeding 0.8 mm, stigmatic branches often  
 exceeding 1.5 mm long; (confined to Maputaland) .....  
 ..... 3. *Schoenoplectus confusus* subsp. *natalitius*

1. *Schoenoplectus muricinix* (C.B. Cl.) J. Raynal in *Adansonia*, ser. 2, 15: 538 (1976); Haines & Lye: 57 (1983); Gibbs Russell: 76 (1985) *pro parte* (*S. muricinix* s.s. only).  
 Type: Rhodesia (Zimbabwe), Matopos, Bulawayo, *Eyles 1202* (K, lecto.! SRGH, iso!).  
 Syntype: South Africa, Orange Free State, *Buchanan 163* (K!).  
 Basionym: *Scirpus muricinix* C.B. Clarke: 135 (1906).

Perennial. *Rhizome* abbreviated, woody, 3 – 4 mm in diameter, holding together contiguous tufted stem bases. *Roots* numerous, 0.3 – 1.3 mm wide. *Culms* (130 –) 210 – 950 mm × 1.5 – 3.6 mm, compressible when dry, terete, glabrous. *Leaves* reduced to 2 – 3 sheaths, apex oblique,

bearing a scabrid-margined reduced leaf blade 1 – 20 mm long. Mouth of uppermost leaf sheath 1.25 – 2.5 mm across, with a broad hyaline margin with a tendency to strip forming a 'ladder' around the culm; ligule 1 – 1.8 mm high. *Inflorescence* a pseudolateral head, or a contracted anthela of clusters of congested spikelets on 1 – 5 slender, unequal, scabridulous branches 30 – 40 (– 50) mm long [specimens from northern Namibia and Transvaal (Limpopo) may have 6 – 7 inflorescence rays, 40 – 50 mm in length] overtopped by a 40 – 150 (60 – 100) mm tapering bract appearing as a continuation of the culm. *Spikelets* sessile, 4 – 5 (– 9) mm × 2 – 3 mm, shortly conical, many-flowered, pale yellow with dark brown to black markings. *Glumes* all fertile, 1.8 – 2.6 mm × 1.5 – 2.3 mm, ovate, convex, glabrous, pale whitish-yellow, frequently green along the keel, flanked by a dark brown-blackish inverted V, margins narrow, hyaline; apex acute to mucronate. Lower glumes and bracts usually bearing scabrid hairs distally on keels and mucros. *Stamens* 3, anthers 0.4 – 0.7 mm, oblong, crest minute, lacking marginal microscopic projections, but occasionally 1 – 2 present terminally. *Bristles* 0. *Style* linear, 0.5 – 0.8 mm, stigmatic branches 3, 1 – 1.5 mm long, papillate. *Achene* 1.2 – 1.6 mm (from apex of beak to achene base) × 0.9 – 1.2 mm, ovate to obovate, trigonous with short beak, shining black at maturity, surface markedly transversely wavy with 12 – 16 waves per achene face and extending over the achene shoulders (markings visible on immature achenes).

#### Selected citations

- 1715 (Ondangwa): Ovamboland; 10 km S. of Oshikango (–BD), *Ward, C.J. & J.D. 91* (NU, PRE).  
 —1824 (Kachikau): Near Goha Hills (–AC), *Smith 2051* (PRE, SRGH).  
 —1918 (Grootfontein): Grootfontein, near aerodrome (–CA), *Schweickerdt 2081* (NU, PRE).  
 —2016 (Otjiwarongo): Quickborn, P.O. Okahandja (–BC), *Bradfield 335 B* (PRE).  
 —2229 (Waterpoort): Farm Weipe 617, flats adjoining Limpopo River (–BC), *Codd & Dyer 3865* (PRE).  
 —2329 (Pietersburg): Pietersburg Commonage (–CD), *Scrimgeour s.n.* (NU).  
 —2425 (Gaborone): 8 km N. of Gaborone (–DB), *Mott 736* (PRE, SRGH).  
 —2428 (Nylstroom): Galpin's Farm, Mosdene, near Naboomspruit (–DB), *Reid 89* (PRE).  
 —2525 (Mafeking): 3 km S. of Lobatsi, E. of railway (–BA), *Leach & Noel 166* (SRGH).  
 —2527 (Rustenburg): Pilansberg, Buffelskloof (–AA), *Smook 1005* (PRE, SRGH).  
 —2529 (Witbank): Loskop Dam Nature Reserve, Rhenosterhoek (–AD), *Reid 1108* (PRE).  
 —2625 (Delareyville): Barberspan Nature Reserve (–DA), *Skead 379* (PRE).  
 —2628 (Johannesburg): Near Daleside (–AC), *Forbes 391* (J).  
 —2631 (Mbabane): Hlatikulu (–CD), *Gordon-Gray, KD. SH10/65* (NU).  
 —2632 (Bela Vista): Blue Jay Ranch, 2 – 3 km S.E. of Umbelosi Beacon, Lubombo Mts. (–AA), *Culverwell 0694* (PRE, SRGH).  
 —2725 (Bloemhof): 30 km N.W. of Avondster at crossing of Harts River (–AC), *Smook 62115* (PRE).  
 —2732 (Ubombo): Mkuze Game Reserve (–CB), *Goetghebeur 4384* (PRE).

- 2826 (Brandfort): Naby Florisbad op pad na Soutpan – in pan (581) (–CA), *Muller 1149* (PRE).  
 —2829 (Harrismith): Weenen Nature Reserve (–DD), *Hilliard & Burt 14470* (NU, PRE).  
 —2924 (Hopetown): 12 km from Wanda to Skuilhoekrand (–CB), *Smook 002806* (PRE).  
 —2926 (Bloemfontein): Blydschap (near Thaba’Nchu) (–BB), *Peeters et al. 427* (J, PRE).

- 2927 (Maseru): Near Tweespruit (–AA), *Armour RAK 3* (NU).  
 —3027 (Lady Grey): 32 km from Zastron on Wepener Rd. (–AA), *Reid 147* (PRE).

#### Extra-territorial

- 1730: 6 km S. of Darwendale near Rhochrome Mine, Great Dyke (–DA), *Wild 6484* (SRGH).  
 —1828: 8 km north of Gokwe on rd. to Chinyenyetu Nhongo

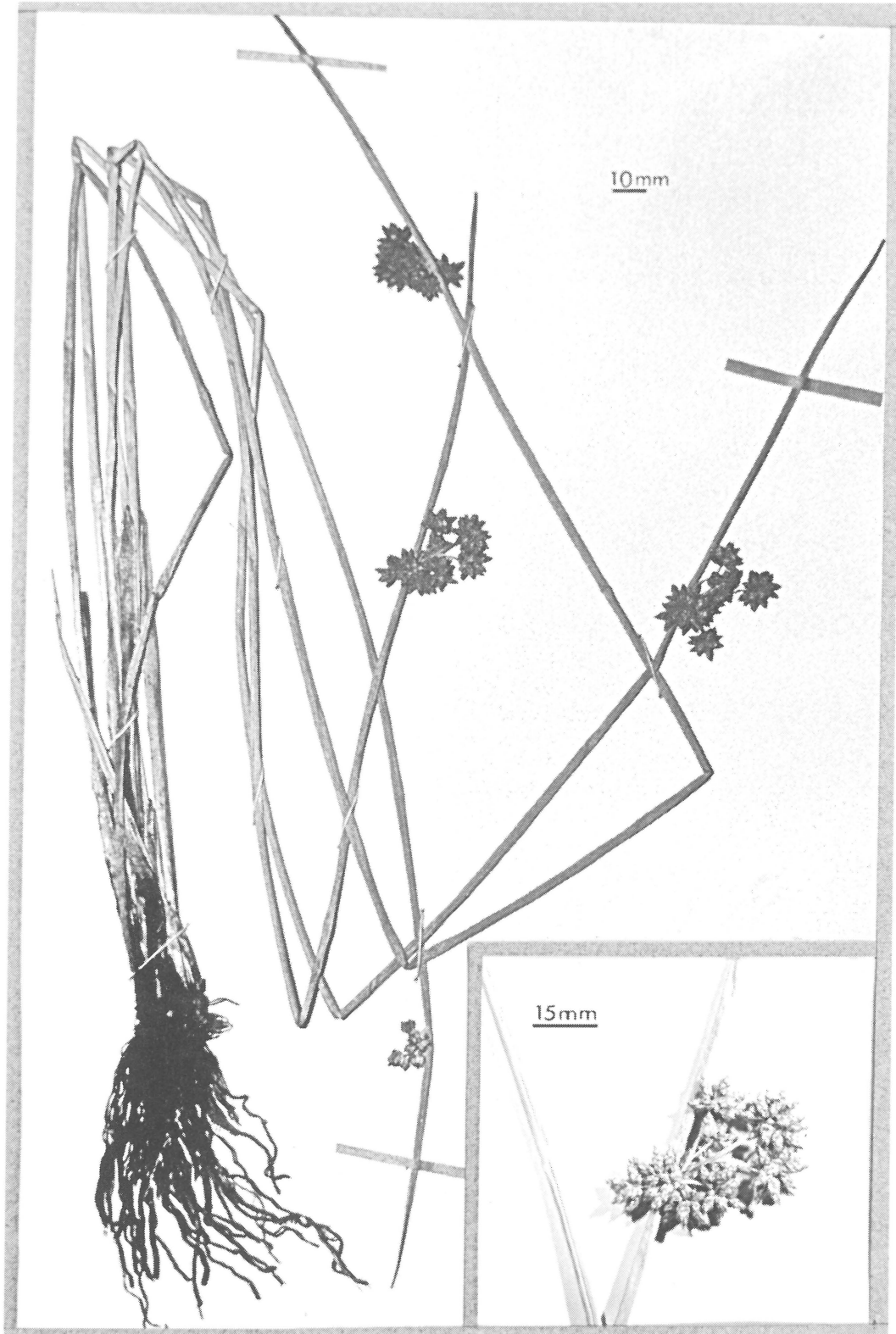


Figure 1 *Schoenoplectus muricinix* s.s. (C.B. Cl.) J. Raynal; *Gericke s.n. J063038* (J), (2528 AA): Bophuthatswana, Klipvoor Dam.

(-BB), *Bingham 592* (SRGH).

—2028: Bulawayo, granite country on margin of pool, *Eyles 1202* (K, lecto, SRGH, iso).

—2028: Lakeside Dam (Bulawayo) (-BA), *Cross 343* (PRE, SRGH).

#### Distribution and habitat

Plants occur in wet or temporarily wet areas (vleis, river banks, marshy ground) from 17° – 31° S latitude and from

15° – 33° E longitude, at altitudes of 550 – 1400 m. From habitat notes it is apparent that plants favour black clay soils. The distribution pattern indicates that there is a preference for the drier, hotter areas of the western part of southern Africa, Botswana (and Zimbabwe), but the species extends to the Transvaal where it is sympatric with *S. muriculatus*. In eastern southern Africa (Swaziland and Natal), collection has been sparse. This may indicate its rarity in this zone. It is of interest to note that *S. muricinix* s.s.



**Figure 2** *Schoenoplectus muriculatus* (Kuekenh.) J. Browning comb. nov.; *Smook 2693* (PRE), (2428 CC): 31 km from Warmbaths on road to Alma via Kwaggasnek.

occurs across southern Africa. The distributional pattern is similar in Zimbabwe, where the species is present from the drier western border to the central area (Harare), where it becomes sympatric with *S. muriculatus*. However, further collecting and careful examination of material from the more remote areas is required to confirm the tendency as here outlined.

2. *Schoenoplectus muriculatus* (Kuekenh.) J. Browning comb. nov.

Type: Rhodesia, Victoria – Ndanga in campo graminoso prope rivum Mitilinwe (Mtilikwe ?), Fries, Norlindh & Weimark 2137 (LD, holo. !).

Basionym: *Scirpus muriculatus* Kuekenh.: 75 (1934).

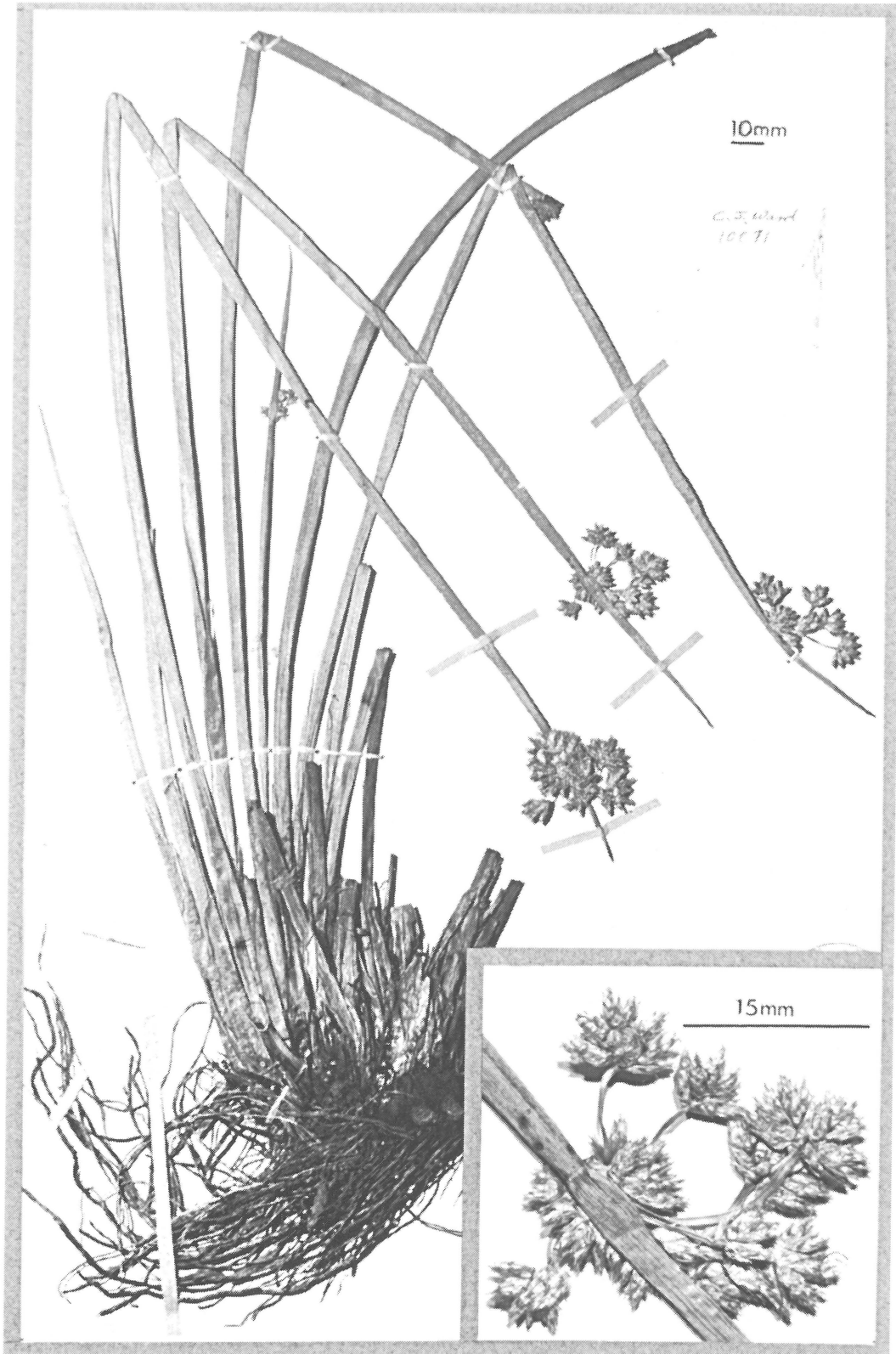
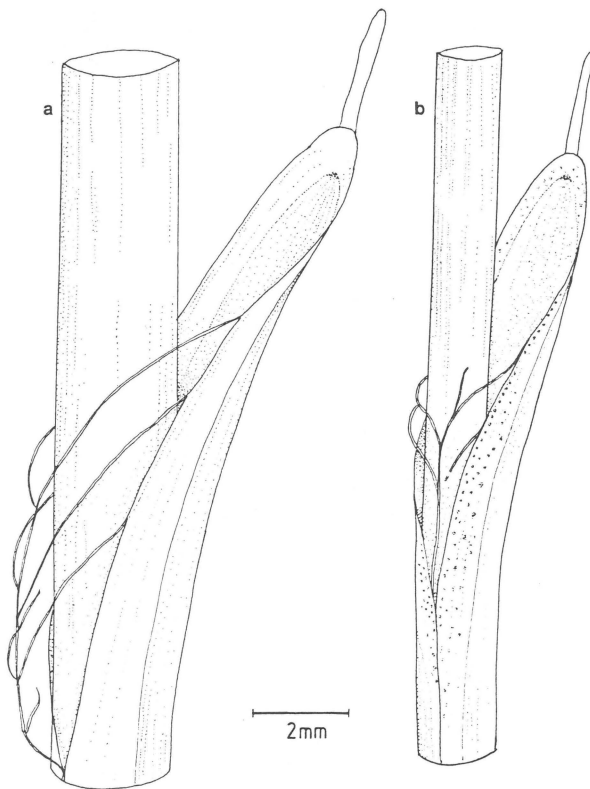


Figure 3 *Schoenoplectus confusus* (N. E. Br.) K. Lye subsp. *natalitius* J. Browning (subsp. nov.); Ward, C.J. 10071 (NU), (2632 CC): Ndumu Game Reserve, Mahemane (North West).

Perennial. *Rhizome* abbreviated, woody, 2 – 3 mm in diameter, holding together contiguous tufted stem bases. *Roots* numerous, 0.5 – 1 mm wide. *Culms* 200 – 750 mm (300 – 400) × 1 – 2 mm, terete, glabrous. *Leaves* reduced to 2 – 3 sheaths, apex oblique, bearing a glabrous or scabrid-margined reduced leaf blade 0.5 – 2 mm (occasionally up to 10 mm) long. Mouth of uppermost leaf sheath 0.6 – 1.5 mm across, with a narrow hyaline margin, with or without brown spots and streaks; ligule 0.3 – 0.5 mm high. *Inflorescence* a pseudolateral head, or a contracted anthela of clusters of spikelets on 1 – 5 slender, unequal, scabridulous branches up to 10 mm long; overtopped by a 20 – 80 mm tapering bract appearing as a continuation of the culm. *Spikelets* sessile, 4 – 6 (– 10) mm × 2 – 3 mm, ovoid to cylindrical, many-flowered, chestnut brown or rust coloured. *Glumes* all fertile, 2.3 – 2.6 mm × 1.5 – 2.3 mm, ovate, keel pallid, convex, glabrous, streaked reddish-brown; margins narrow, hyaline; apex acute to mucronate. Lower glumes and bracts bearing scabrid hairs on keels and mucros. *Stamens* 3, anthers 0.4 – 0.6 mm, oblong; crest minute, lacking marginal microscopic projections. *Bristles* 0. *Style* linear 0.5 – 1.0 (0.75) mm, stigmatic branches 3, 1 – 1.5 mm long, papillate. *Achene* 1.2 – 1.6 mm (from apex of beak to achene base) × 0.9 – 1.2 mm, ovate to obovate, trigonous with short beak, shining dark brown or black at maturity, surface with 8 – 10 transverse ridges per achene face which may or may not extend over the achene shoulders (markings visible on immature achenes).

#### Selected citations

—2329 (Pietersburg): Pietersburg Commonage (–CD), *Scrimgeour*



**Figure 4** Leaf sheaths. Sheaths pulled away from culms to show inner surface and ligule. (a) *Schoenoplectus muricinux* s.s. (C.B. Cl.) J. Raynal; (b) *Schoenoplectus muriculatus* (Kuekenh.) J. Browning comb. nov.

*J063037* (J).

—2427 (Thabazimbi): 61 km west of Warmbaths on road to Thabazimbi near Leeupoort Mine (–DC), *Reid 448* (PRE).

—2428 (Nylstroom): 31 km from Warmbaths on road to Alma via Kwaggasnek (–CC), *Smook 2693* (PRE).

—2525 (Mafeking): Mathethe (–AA), *Hillary & Robertson 596* (PRE).

—2628 (Johannesburg): Burttholm, Vereeniging (–CA), *Burt-Davy 17696* (J).

—2629 (Bethal): 49 km east of Bethal on road to Ermelo (–DB), *Reid 796* (PRE).

—2631 Mbabane): Hlatikulu (–CD), *Gordon-Gray, K.D. SH6/65 and SH8/65* (NU).

—2730 (Vryheid): Utrecht to Wakkerstroom, 10 km (–CB), *Goetghebeur 4330* (PRE).

—2829 (Bethlehem): Leribe (–CC), *Dieterlen 769* (NBG, PRE).

—2829 (Harrismith): Estcourt distr., Winterton (–DC), *King 378* (NU, PRE).

—3029 (Kokstad): Mt. Currie (–AD), *Taylor, P.B. 61* (NU).

#### Extra-territorial

—1731: Salisbury: Thorn Park (–CA), *Paterson 23A* (PRE); Salisbury, Rainham Dam (–CC), *Robinson 1801* (NU).

—1929: Gokomera N.P.A., *Ward, F.S. 52* (SRGH).

—2028: Matopos (–AD), *Brain 7639* (SRGH).

—2031: Victoria – Ndanga in campo graminoso prope rivum Mitilwe (Mtilikwe ?) (–AA), *Fries et al. 2137* (LD).

#### Distribution and habitat

*S. muriculatus* is distributed in southern Africa from 23° – 30° S latitude and from 25° – 31° E longitude. It is also present further north in Zimbabwe, but distributional limits have not yet been fully established. Plants occur in wet situations, apparently without preference for any particular soil type. The species is recorded from altitudes of approximately 1000 m upwards, but precise data relating to the uppermost altitudinal limits are still required. In Natal it is sympatric with *S. paludicola* at Mt. Currie (Kokstad – 3029 AD), for example *Taylor, P.B. 61* (*S. muriculatus*) and 60 (*S. paludicola*), (both NU), at an altitude of 1500 m, but in other parts of its range it deviates from the predominantly lowland *S. paludicola*, preferring higher altitudes.

In the Orange Free State, near the Lesotho boundary, *S. muriculatus* is sympatric with *S. muricinux* s.s.; likewise in Swaziland, the Transvaal and Zimbabwe (see Figure 8). It is therefore not surprising that mixed gatherings exist in herbaria [*Jacot Guillarmod 5861* (PRE), —2927 AD; *Reid 93* (PRE), —2428 DB].

*S. muriculatus* is represented from the south-eastern extremity of Botswana, but by only one known gathering, *Hillary and Robertson 596* (PRE), —2525 AA. Other specimens from northern Botswana, the Caprivi Strip and western Zimbabwe previously identified as *S. muriculatus* are not that species; their affinity is with *S. corymbosus*.

**3. *Schoenoplectus confusus*** (N.E. Br.) K. Lye in *Botanische Notiser* 124 (2): 290 (1971); Basionym *Scirpus confusus* N.E. Br.: 300 (1921).

Type: Abyssinia (Ethiopia), near Amogai, *Schimper 253* (K, holo.!, BM, iso!).

subsp. *confusus*  
var. *confusus*

This typical variety is without hypogynous bristles in the floret. It is known from Ethiopia and tropical Africa including Zimbabwe where it is rare.

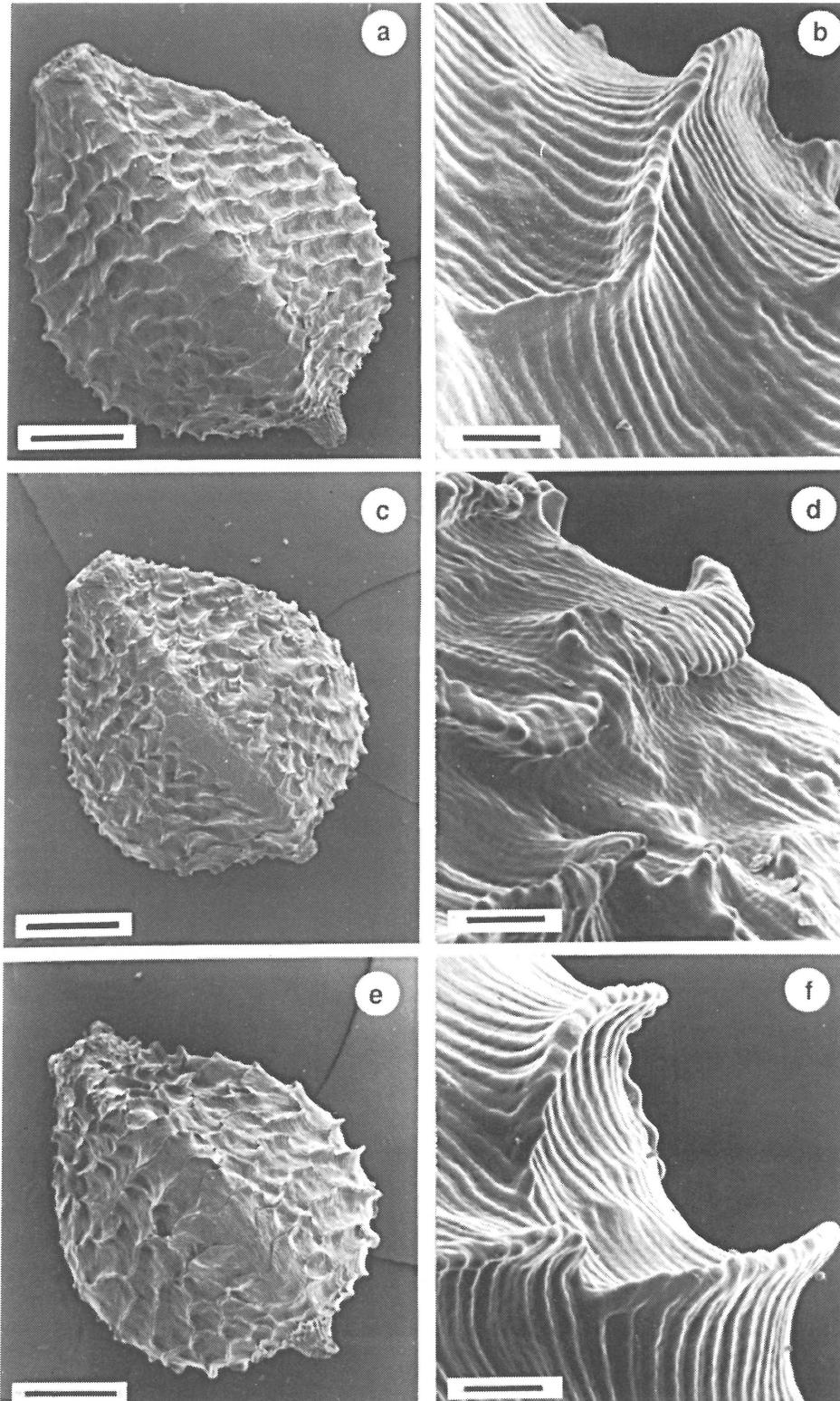
var. *rogersii* (N.E. Br.) K. Lye: 3 (1983)

Basionym: *Scirpus rogersii* N.E. Br.: 301 (1921)

Type: S. Rhodesia [Zimbabwe], Matopos, *Rogers 7914* (K, holo.!).

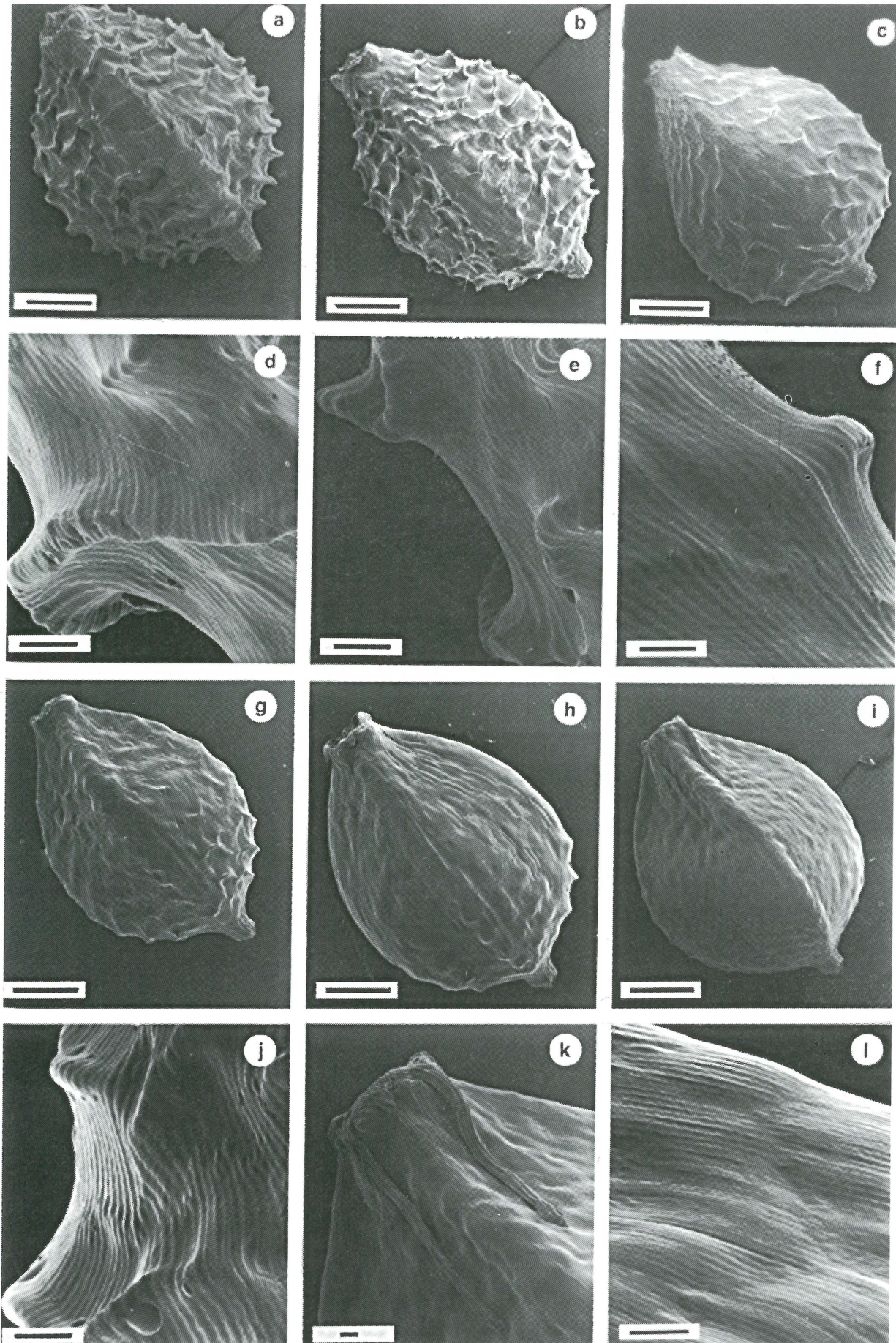
Syn: *Schoenoplectus rogersii* (N.E. Br.) K. Lye: 124 (1971)

This variety is differentiated on the presence of 4 – 5 hypogynous bristles per floret. It is recorded from Zimbabwe (where it is frequent) and from other parts of tropical Africa where it appears to have common areas of distribu-



**Figure 5** Achenes of *Schoenoplectus muricinux* s.s. (C.B. Cl.) J. Raynal. (a) & (b) *Gordon-Gray, K.D. SH10165* (NU); (c) & (d) *Smook 002806* (PRE); (e) & (f) *Forbes 391* (J). Black scale bar for achenes: 250  $\mu$ m; black scale bar for achene surfaces: 25  $\mu$ m.





**Figure 6** Achenes of *Schoenoplectus muriculatus* (Kueenth.) J. Browning comb. nov. (a) & (d) *Gordon-Gray, KD. SH8/65* (NU); (b) & (e) *Robinson, 1801* (NU); (c) & (f) *Burt-Davy, 17696* (J); (g) & (j) *Fries et al. 2137* (LD); (h) *Goetghebeur 4330* (PRE); (i), (k) & (l) *Arnold 1082* (PRE) (Putative hybrid?: note presence of two bristles). Black scale bar for achenes: 250  $\mu$ m; black scale bar for achene surfaces: 25  $\mu$ m.

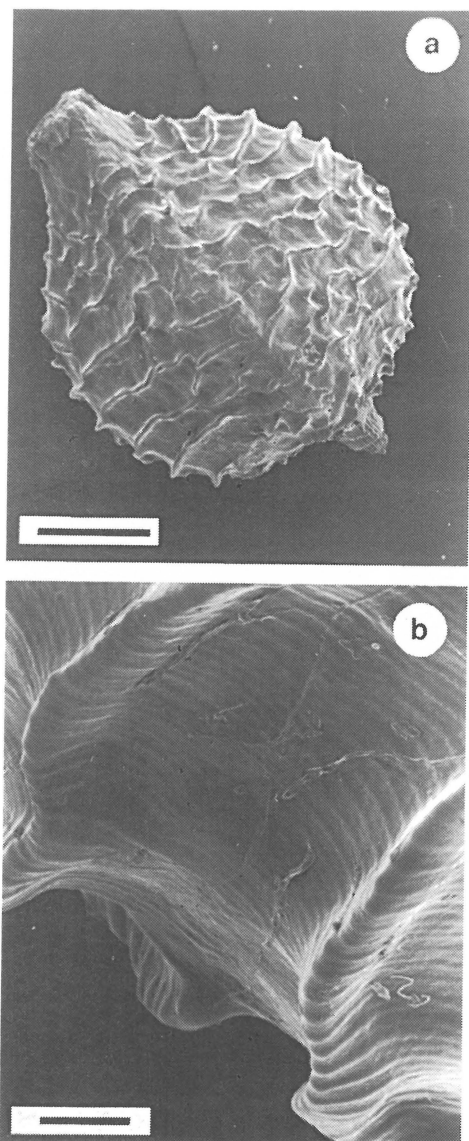


Figure 7 Achenes of *Schoenoplectus confusus* (N.E. Br.) K. Lye subsp. *natalitius* (subsp. nov.). (a) & (b) *Hitchins* 823 (PRE). Black scale bar for achene: 250 µm; black scale bar for achene surface: 25 µm.

tion with var. *confusus*.

In Natal (Maputaland only) is an entity with close affinity with the species but distinct from either of the above varieties and with a discontinuous distribution. It is here given subspecific ranking as subsp. *natalitius* J. Browning subsp. nov.

subsp. *natalitius* J. Browning subsp. nov., *differt a subsp. confusus* var. *confusus* *spiculis minoribus, et cum minus brunneo colore in spiculis; antherae cum ultimis spinis ad cristam et discreta distributione. Differt a subsp. confusus* var. *rogersii* *his characteribus et sine setis*.

Types: South Africa, Maputaland, Mkuze Game Reserve, Beacon, *Goodman* 1237 (NU holo.; BM, K, PRE iso.).

Perennial. *Rhizome* abbreviated, woody, 4 – 7 mm in diameter, holding together contiguous tufted stem bases. *Roots* numerous, 0.2 – 1.0 mm wide. *Culms* 430 – 1100 mm × 2.0 – 3.5 mm, terete, compressible when dry, glabrous. *Leaves* reduced to 2 – 3 sheaths, apex oblique, with or

without a glabrous or scabrid-margined reduced leaf blade 0.5 – 2.5 mm long. Mouth of uppermost leaf sheath sharply tapering to 1 mm width at origin of reduced leaf blade, margin narrow (0.25 – 1.0 mm), with or without red spots, showing a marked tendency to strip forming a 'ladder' around the culm. Ligule absent, or if present 0.5 – 0.8 mm in height. *Inflorescence* a pseudolateral head, or a contracted anthela of clusters of spikelets on 1 – 8 slender, unequal, scabridulous branches 10 – 35 (– 20) mm long, overtopped by a 20 – 90 mm tapering bract appearing as a continuation of the culm. *Spikelets* sessile, 4 – 6 mm × 2 – 2.5 mm, many-flowered, pale yellow with or without dark brown markings. *Glumes* all fertile, 2.4 – 3.4 mm × 1.6 – 2.5 mm, ovate, convex, glabrous, pale whitish-yellow with or without pronounced dark brown streaking forming an inverted V, margins narrow, transparent, mucro dark, either straight or recurved with apical scabrid hairs. (Lower glumes and bracts usually bearing scabrid hairs on the keels.) *Stamens* 3, anthers (including crest) 0.9 – 1.3 mm, oblong; crest small with terminal microscopic projections. *Bristles* 0. *Style* linear, 0.8 – 2.0 mm, stigmatic branches 3, 1.3 – 2.3 mm long, papillate. *Achene* 1.1 – 1.5 mm (from apex of beak to achene base) × 1.0 – 1.1 mm, ovate to obovate, trigonous with short beak, shining dark brown to black at maturity, surface transversely wavy with 12 – 16 waves per achene face extending over the achene shoulders (markings visible on immature achenes).

*Goodman* 1237 (NU) has been selected as the type because it bears fully mature achenes; also there are several isotypes.

#### Citations

—2632 (Bela Vista): Ndumu Game Reserve, Mahemane area (–CB), *Tinley* 863 (NU); Mahemane (North West) (–CC), *Ward* 10071 (NU); Ndumu Game Reserve (–CD), *Pooley* 1263 (NU).

—2732 (Ubombo): Pongola River Flood Plain, near road from Ndumu to Josini (–AA), *Balkwill et al.* 2963 (J); Mkuze Game Reserve (–CA), *Tinley* 614 (NH, NU, PRE); *ibidem* *Ward* 4568 (NH, NU, PRE); Beacon, *Goodman* 1237 (NU); Ubombo (–CB), *Taylor* 23 (NH); Mozi swamp, Grassland near Mkuze inlet (–CD), *van Wyk* 680 (NH).

—2832 (Mtubatuba): Hluhluwe Game Reserve (–AA), *Ward* 1969 (NU, PRE), 5602 (PRE), *Hitchins* 823 (PRE).

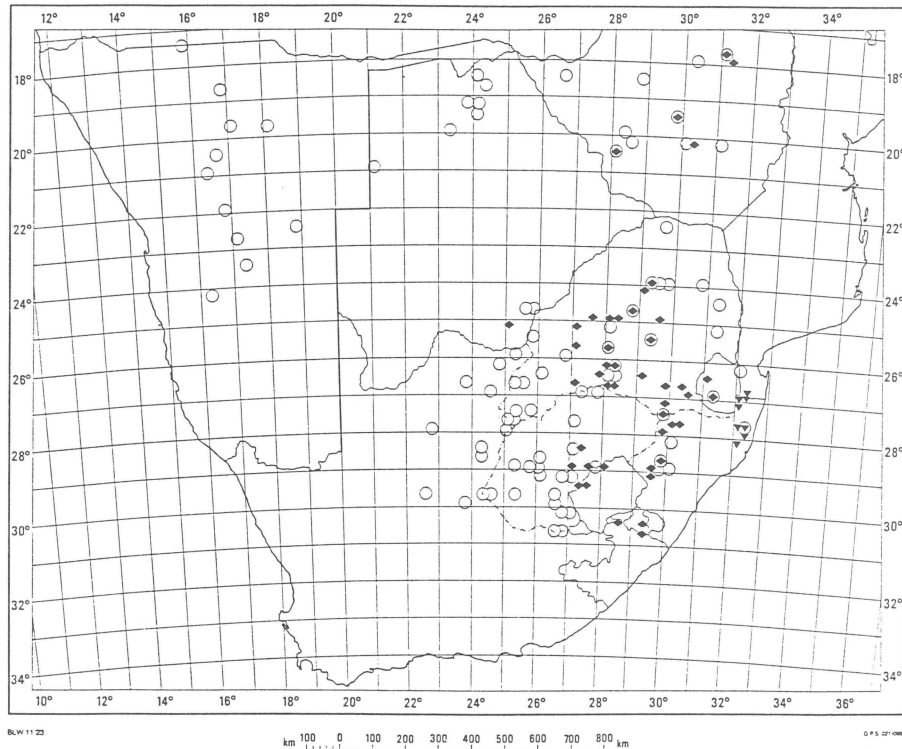
#### Distribution and habitat

This subspecies has a restricted distribution in southern Africa, being recorded only from Maputaland (Natal). It appears that altitude may have a limiting effect on its distribution as plants are known only from 40 – 105 m above sea-level.

The plant grows as an emergent in seasonal pans and vleis in water up to 0.5 m deep. It is recorded from Mkuze inlet as growing in hygrophilous grassland.

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**Figure 8** Recorded distribution. *Schoenoplectus muricinex* s.s. (C.B. Cl.) J. Raynal: ○; *Schoenoplectus muriculatus* (Kuekenth.) J. Browning comb. nov.: ◆; *Schoenoplectus confusus* (N.E. Br.) K. Lye subsp. *natalitius* J. Browning (subsp. nov.): ▼.

his observations on specimens of *Schoenoplectus muricinex* s.l. in the herbarium in Gent. Mr. D.L. Pike is thanked for the Latin translation. Mr. T.J. Edwards and Prof. K.D. Gordon-Gray are gratefully acknowledged for their unfailing assistance, patience and guidance.

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