- - 6 Plants erect, culms suffrutescent below, lowest nodes usually leafless; spikelets 4-5 mm long; glumes slightly shorter than lemmas2d. E. setacea subsp. disticha

1. Ehrharta rupestris Nees ex Trin., Phalaridea, Zap. Imp. Akad. Nauk., ser. vi., 5(3): 25 (1839). Type: Caledon Dist., Gnadenthal, Drège (K, isosyn.; SAM, isosyn.; photo. and fragment in PRE).

Rhizomatous perennial of widely varying size and habit, from delicate plants 100 mm tall to robust suffrutescent plants 450 mm tall. Culms erect or decumbent, branched and creeping at base, bare of leaves below. Leaves with blades erect or spreading, inrolled, folded or flat; ligule a membrane fringed with hairs; sheaths overlapping. Inflorescence an erect raceme held above leaves. Spikelets 1-9, erect, often distichous. Glumes about 1 length of longest lemma, lower truncate or rounded, upper acute. Florets with sterile lemmas dissimilar, the first a thin scale with 3-5 raised nerves, $\frac{1}{3}-\frac{1}{2}$ length of second, often appearing to be a third glume; the second hard and thickened, with 7 minutely tubercled nerves, tip canoe-shaped; fertile lemma similar to second sterile lemma, but slightly shorter, broader and with more acute tip. Stamens 6.

(a) subsp. **rupestris.** Stapf in Fl. Cap. 7: 668 (1900); Chippind. in Meredith, Grasses & Past. S. Afr. 37 (1955).

An uncommon subspecies represented by scattered specimens from Worcester and Caledon eastward along the Swartberg to Prince Albert. It is most abundant and appears in its typical form in the Riviersonderend mountains of the Caledon and Bredasdorp grids. Along the Swartberg there are intermediates to subsp. *tricostata* and, as in that subspecies, the smallest plants occur at the extreme east of the range. The folded leaf blades with hooded tips and the broad spikelets separate this subspecies from all other taxa in the group. It grows on mountain slopes among rocks at altitudes of 910 to 1 970 m.

One particularly robust specimen was collected on coastal sand in the Vanrhynsdorp area (Van Breda 4436), north-west of the range of the rest of the species. This may prove to be a separate taxon, but more material is needed.

(b) subsp. tricostata (Stapf) Gibbs Russell, comb. et stat. nov.

Ehrharta tricostata Stapf in Fl. Cap. 7: 669 (1900); Chippind. in Meredith, Grasses & Past. S. Afr. 35 (1955). Type: French Hoek, 2400 feet, Schlechter 9292 (K, holo.; PRE, iso.).

This is the commonest and most widespread of the three subspecies of *E. rupestris*, extending from the Cape Peninsula north to the Hex River mountains and western end of the Swartberg, and extending east along the coastal ranges nearly to Hermanus. It is variable in habit: plants from the Peninsula and Caledon are most robust and erect, with either reduced, setaceous or flat leaf blades; plants from the Hex River mountains are often decumbent, herbaceous and with flat leaf blades; and plants from the easternmost part of the range are small and fine, although with suffrutescent culm bases. All these forms grade gradually into each other. Furthermore, numerous intermediates link this subspecies with the other two, which may be considered extreme forms. In habit it is most like *E. setacea* subsp. *setacea*, but that taxon has scale-like overlapping bladeless sheaths on the lower part of the culms, whereas this subspecies has blade-bearing leaves nearly to the culm base. It grows in wet places on mountain slopes and at the base of cliffs, at altitudes of 300-2030 m.

(c) subsp. dodii (Stapf) Gibbs Russell, comb. et stat. nov.

Ehrharta dodii Stapf in Fl. Cap. 7: 670 (1900); Chippind. in Meredith Grasses & Past. S. Afr. 35 (1955). Type: Cape, rocks on Constantia Berg, *Wolley Dod* 1961 (K, holo.; BOL, iso.; photo. and fragment in PRE).

This subspecies occurs only immediately around False Bay and northwards to the Hex River mountains. It differs from subsp. *tricostata* mainly in its smaller size and fewer spikelets, and is connected to that subspecies by intermediates of slightly larger stature and more spikelets. These are found within the range of typical subsp. *dodii* as well as to the east as far as Montagu. The Hex River mountain form of subsp. *tricostata* should perhaps be counted among these intermediates.

Because it is reduced, *E. rupestris* subsp. *dodii* is difficult to distinguish from the two small subspecies of *E. setacea*, subsp. *uniflora* and subsp. *disticha*, except on spikelet characteristics. In general, *E. rupestris* subsp. *dodii* is upright with erect rolled leaf blades, *E. setacea* subsp. *uniflora* is sprawling with flat leaf blades, and *E. setacea* subsp. *disticha* is upright with spreading rolled or folded leaf blades. However, the habit of each is variable to some extent. This subspecies grows in wet places among rocks and at the bases of cliffs, and at altitudes of 660-1 660 m.

2. Ehrharta setacea Nees, Fl. Afr. Austr. 228 (1841). Type: Cape, in monte tabulari, alt. 3 000 ft, Drège (PRE, isosyn., fragment).

Erect or trailing tufted perennial with creeping rhizomes. *Culms* decumbent or prostrate, suffrutescent to herbaceous, often bare of leaves below. *Leaves* with blades erect, recurved or spreading, inrolled, folded or flat; ligule a membrane fringed with hairs. *Inflorescence* an erect raceme barely to considerably overtopping leaves. *Spikelets* 1–15, at first erect but spreading at anthesis. *Glumes* $\frac{2}{3}$ (rarely only $\frac{1}{2}$) as long to longer than lemmas, both acute. *Florets* as in *E. rupestris*.

(a) subsp. setacea Stapf in Fl. Cap. 7: 668 (1900); Chippind. in Meredith, Grasses & Past. S. Afr. 37 (1955).

This is the most often collected and the most widespread of the four subspecies of *E. setacea*, occurring on the Cape Peninsula and as far north-west as Sneeuwkop near Wellington and as far east as Bredasdorp. In the Klein River Mountains of the Caledon District it is linked to subsp. *uniflora* through intermediates. It grows in damp, peaty or marshy places, in seepage areas in shale or in wet sand from Table Mountain sandstone, at altitudes of 660-1515 m.

(b) subsp. scabra (Stapf) Gibbs Russell, stat. nov.

Ehrharta setacea Nees var. scabra Stapf in Fl. Cap. 7: 669 (1900). Type: Cape, in a mountain peak near Swellendam, Swellendam Div., Burchell 7312 (L, holo.; photo. in PRE).

This subspecies occurs along the Langeberg from the Clock Peaks above Swellendam to Garcia's Pass, east of the range of the other subspecies. In the Caledon quarter degree square a number of intermediates link it to subsp. *uniflora*, which is also linked in the same area to subsp. *setacea*. The subspecies grows mostly in disturbed places on mountainsides, such as beside paths and in burned clearings, but is has occasionally been collected among rocks and in seepage areas, at altitudes of $350-1\ 212\ m$.

(c) subsp. uniflora (Burch. ex Stapf) Gibbs Russell, comb. et stat. nov.

Ehrharta uniflora Burch ex Stapf in Fl. Cap. 7: 670 (1900); Chippind. in Meredith, Grasses & Past. S. Afr. 37 (1955). Type: Cape Div., Cape Flats near Rondebosch, *Burchell* 182 (K, holo.; photo. in PR).

Known only from the Cape Peninsula and Caledon Districts, this subspecies grades into both subsp. *setacea* and subsp. *scabra* in the Caledon District, thus linking the two most widespread and disparate elements in the species. It grows in seepage areas, marshy places and along water-courses, and also at forest margins. It occurs at the lowest altitudes of any taxon in this species group, from 10-500 m.

(d) subsp. disticha Gibbs Russell, subsp. nov. a subspecie typica parviore statura ad 250 mm altum, 1-2 spiculis 4-5 mm longis, glumis hiantibus ad maturitatem differt. A subspecie *uniflora* habitu erecto, culmis basaliter suffruticosis destitutis folios, glumis lemmatibus paulo brevioribus differt.

Plant perennial, erect, cushion forming, to 250 mm tall. Culms suffrutescent, branched near base,

bare of leaves below. Leaves profuse, with blades rolled or folded, distichous, usually held at 45° to culm, uncommonly erect, to 30 mm long; ligules membranous, fringed with hairs; sheaths strongly overlapping, with a tuft of hairs at sheath mouth and auricles. Inflorescence of 1 or 2 spikelets, 5-10 mm long, barely overtopping leaves. Spikelets 4-5 mm long, glumes slightly shorter than lemmas, gaping more than 45° at maturity. Florets with sterile lemmas dissimilar, the first a thin scale with 3-5raised nerves, $\frac{1}{2} - \frac{1}{2}$ length of second, often appearing to be a third glume, the second sterile lemma hard and thickened, with 7 minutely tubercled nerves, tip canoe-shaped; fertile lemma similar to second sterile lemma, but slightly shorter, broader and with more acute tip. Stamens 6. Mature caryopses not seen.

TYPE.—Cape 3419 (Caledon): Maanschynkop, Rocklands Peak (-AD), rocky places on upper slopes and along ridge, N. aspect, ± 2500 feet, *Esterhuysen 31735* (PRE, holo.; BOL, iso.)

Known only from quarter degree grid square 3419AD, where it grows in dry rocky places on mountain slopes from 580-1 225 m. Flowering October-December.

CAPE.—3419 (Caledon): Babylon's Tower (-AD), Esterhuysen 32319 (BOL, PRE), 34755 (BOL, PRE); Maanschynkop, Klein River Mts (-AD), Esterhuysen 33647 (BOL, PRE); Vogelgat, south of the Sheiling (-AD), Esterhuysen 35539a (BOL), Williams 3086 (NBG, PRE); Fernkloof Nature Reserve (-AD), Williams 2887 (NBG).

This subspecies does not appear to be linked by intermediates to the other subspecies, even though it occurs in the only quarter degree square where intermediates are found between subsp. *uniflora* and both subsp. *setacea* and subsp. *scabra*. However, in subsp. *disticha* the position of the leaf blades is variable even on the same plant. Normally they are held at 45° to the culm as in subsp. *scabra*, but occasionally they are held erect as in subsp. *setacea*.

G. E. GIBBS RUSSELL*

* Botanical Research Institute, Department of Agriculture, Private Bag X101, Pretoria 0001.

SIMAROUBACEAE

FLOWERING IN KIRKIA WILMSII ENGL.

Some plants, such as cycads, are known to sometimes change sex under stress, e.g. when transplanted or damaged, or when growing under unfavourable conditions. Others, e.g. Cannabis sativa, will change sex ratios gradually over the growing season, the sex expression probably being controlled by daylength. However, no record has been found in the literature of a species in which the two sexes alternate a number of times in one flowering season, such as has been recently observed in Kirkia wilmsii.

The genus *Kirkia* is a tropical African genus of five species, recently revised by B. Stannard [*Kew Bull.* 35,4 : 829 (1981)]. It is usually placed in the

Simaroubaceae, but some consider it to constitute a family on its own, the Kirkiaceae (Engl.) Tahkt. *K. wilmsii* Engl. is endemic to the Transvaal lowveld, where it is a common tree on rocky hillslopes and in kloofs, occurring on both granitic and dolomitic soils. The leaves are deciduous, and at anthesis the new leaves are still immature. Flowers are produced in axillary panicles in spring.

During 1981 and 1982 observations were made on three trees of this species growing on a rocky, north-facing slope in the Pretoria National Botanical Garden. These three trees were growing outside the natural range of the species, though only by a matter of some kilometres. The nearest naturally-growing