The above (no repulsion, aggregation and feeding habits) suggest that Hutchinson's hypothesis is not complete. If the markings act as mimics then it is probably to attract beetles, presumably for their role in pollination. This would then be a case of reproductive mimicry (sensu Wiens 1978), similar in a way to pseudocopulatory orchids. Obviously this study of one beetle and daisy species needs to be broadened before Hutchinson's intriguing hypothesis of this little-studied syndrome of Cape plants is fully tested.

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OXALIDACEAE

A NEW SPECIES OF *OXALIS* FROM THE WESTERN CAPE

Oxalis oculifera *E.G.H. Oliver*, sp. nov. in Sectione *Latifoliolatis*, in genere singularis propter tubum corollae rubrum papillatum partem alterum violaceo-roseum annulo mediano alba, foliola subpeltata subparallela glauca.

Planta parva, 5–15 mm alta. *Bulbus* ovoideus, 8 × 6 mm, ferrugineus, vaginis papyraceis tectus, vaginis in parte inferiore diagonaliter secedentibus. *Folia* 1–9; petiolus 2–20 mm longus, sparse glandulopilosus, roseus; foliola 3, interdum 2 vel 1, subparallela, 3.0–4.5 × 3.0 mm, semiconduplicata, oblique subpeltata, basaliter subinfundibuliformia, late elliptica ad obovata, interdum oblongo-elliptica, apice late obtusa vel plus minusve emarginata base obtusa, glauca, adaxiale dense papillata, abaxiale glabra sed interdum locis parvis croceis callosis, margine hyalino et intra zona crocea gracili callosa; petioluli 0.3–0.6 mm longi. *Pedunculi* uniflori, 20–37 mm longi, erecti demum prostrati, sparse glandulopilosi, rosei; bracteae absentes interdum 1 vel 2 in parte superiore, filiformes vel lineares, ad 0.6 mm longae, sparse glandulopilosae. *Sepala* 1.7–1.9 × 0.7–0.9 mm, appressa, ovata ad late ovata, interioria angustissima, subacuta, rasilia et sparse glandulopilosa, zona marginali atropurpurea et zona proxime interiore aurantiaca callosa, parte cetera viridi erubescenti. *Corolla* ± 9–10 mm longa, late salviformis, violaceorosea fauce cum annulo albo et tubo vinaceorubro; petala 5–6 mm lata, oblique obovata ad late subspathulata, base parum conjuncta, abaxiale sparsissime glandulopilosa, ecallosa, adaxiale in zona rubra papillata. *Stamina* in seriebus tribus, base longitudine 0.5–0.8 mm conjuncta; antherae albae marginibus atropurpureis; filamenta purpurea sparse glandulopilosa; pollen tricolporatum, ellipsoideum, in antheris superioribus medianisque album, in antheris inferioribus luteum. *Ovarium* 0.7–1.0 mm longum, ovoideum, uniovulatum, in parte superiore sparse glandulopilosum; styli in seriebus tribus, mediani superioresque erecti ad parum patentes, inferiores valde porrecti, sparse glandulopilosi purpurei; stigmata fimbriata, superiora medianaque purpurea, inferiora alba. Figura 6.

TYPE.—3118 (Vanrhynsdorp): Cape Province, Vanrhynsdorp Dist., Gifberg/Matsikamma area, central plateau W of van Taakskom near top of the pass, 595 m, (–DD), 12-06-1990, *Oliver 9558* (STE, holotype; BOL, K, PRE isotypes).

Dwarf stemless plants 5–15 mm high, aggregated into clumps. *Bulb* ovoid, 8 × 6 mm, light reddish brown, covered with papery sheaths splitting diagonally in lower part. *Rhizome* vertical up to 20 mm long. *Stem* none or very short up to 4mm long. *Leaves* 1–9 per plant; petiole 2–20 mm long, sparsely glandular pilose, pinkish; leaflets mostly 3, occasionally 2 or 1, subparallel, 3.0–4.5 × 3.0 mm, semiconduplicate, obliquely subpeltate, basally subinfundibuliform, broadly elliptic to obovate, occasionally oblong-elliptic, apically broadly rounded or slightly emarginate basally rounded, glaucous, adaxially densely papillate, abaxially glabrous, with hyaline margin and inside this a thin orange callose zone, sometimes with scattered small orange callose patches abaxially; petiolule 0.3–0.6 mm long. *Peduncle* 1-flowered, 20–37 mm long, erect becoming prostrate, markedly glandular pilose when young and short, becoming sparsely so when mature, pinkish; bracts usually absent, sometimes 1 or 2 on upper part of peduncle, filiform or linear up to 0.6 mm long, sparsely glandular pilose. *Sepals* 1.7–1.9 × 0.7–0.9 mm, adpressed to corolla and joined at base, lobes ovate to broadly ovate with inner ones narrowest, subacute, glabrous and sparsely glandular pilose, with very dark purple marginal zone and orange callose zone just inside that, the rest green becoming reddish. *Corolla* about 9–10 mm long, broadly salver-shaped, violet-pink with white

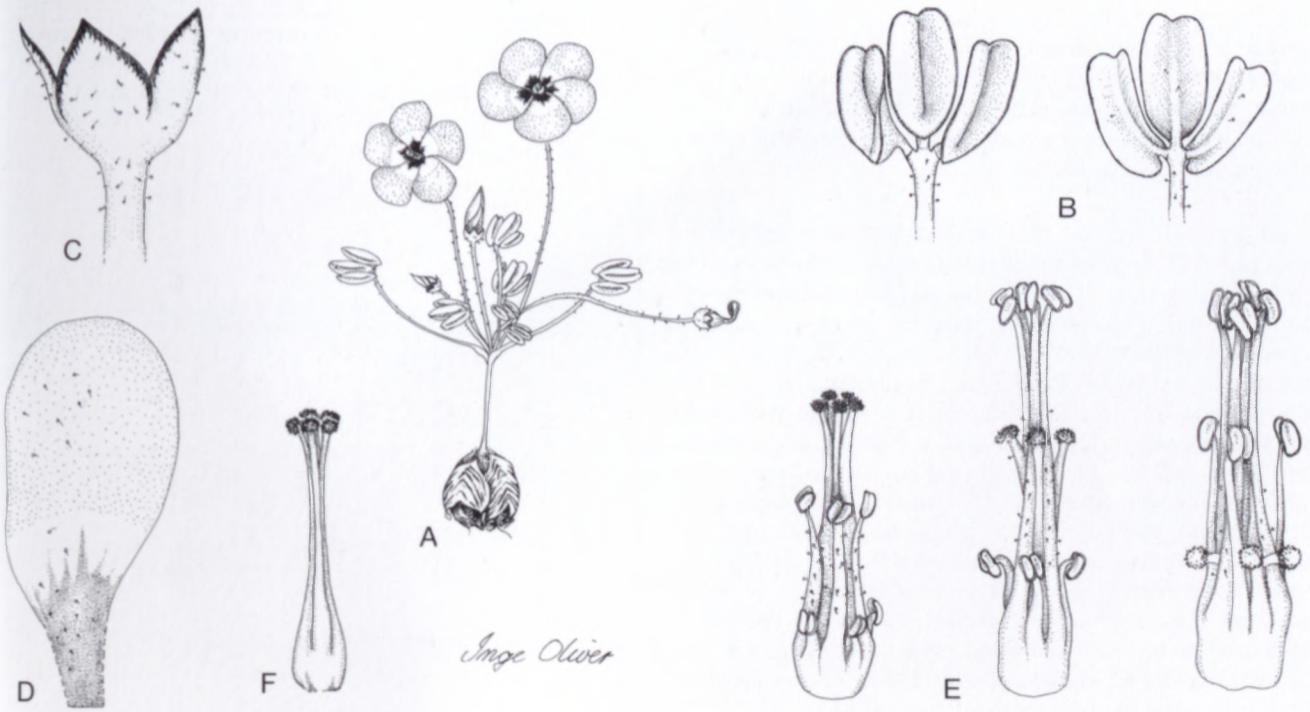

FIGURE 6.—*Oxalis oculifera*: A, plant, × 2; B, leaf, adaxial view, on left, & abaxial view, on right, × 12; C, calyx, × 25; D, petal, abaxial view, × 25; E, the three trimorphic series of the androecium and gynoecium, × 25; F, gynoecium, × 25. All drawn from the type, *Oliver 9558* (STE).

ring in throat and wine-red tube; petals 5–6 mm wide, obliquely obovate to broadly subspathulate, joined slightly at base, very sparsely glandular pilose abaxially on outer margin, ecallose, papillate adaxially on red zone. *Stamens* in 3 series, 2 series per plant, the shortest 1.2 mm long, the middle 2.0–2.3 mm long, the longest 3.0–3.5 mm long, all joined for 0.5–0.8 mm at base, the uppermost manifest, the rest included; anthers white with dark purple edges; filaments purplish, sparsely glandular pilose; pollen tricolporate, ellipsoid, in upper and middle anthers white, in bottom anthers yellow. *Ovary* 0.7–1.0 mm long, ovoid, sparsely glandular pilose in upper half, 1-ovuled; styles in 3 series, the lowest 0.5 mm long, markedly spreading and white, the middle 1.2 mm long and the uppermost series 3 mm long, the latter two series erect to slightly spreading purplish sparsely glandular pilose; stigmas fimbriate, the uppermost and middle series purple, the lower series white. Figure 6.

This new species of *Oxalis* is remarkable in the genus on account of the colour of its corolla and the distinctive shape of its leaves. The corolla tube is wine-red with a white ring in the throat, the rest of the corolla being violet-pink. The glaucous leaflets are unusual for being obliquely peltate with the petiolule attached abaxially to the lamina. The leaflets are subparallel next to each other and not spreading. They are semiconduplicate in a broad V-shape with the basal portion above the petiole often partially funnel-shaped.

O. oculifera falls within the Section *Latifoliolatae* which Salter (1944) described as an unnatural assemblage of species. It is defined as having those species forming acaulescent plants with broad, but never linear or oblong, leaves. Within the section this species is probably most closely allied to *O. petiolulata* Bol. f.

O. petiolulata appears to be confined to the central and northern parts of the Cedarberg near Clanwilliam where it is known from only three collections, all in BOL (*H. Bolus 8952*, the type; *Adamson in BOL 20492* and *Pocock s.n.*). All three have very differently sized leaves with *Adamson in BOL 20492* having the smallest leaves most similar to those in the new species. The Pocock specimen has no flowers and was determined with a query by Salter.

In *O. petiolulata* the plants are very sparsely and minutely glandular pilose, not glabrous as recorded by Salter. The sepals are sparsely ciliate with short rather thick hairs. The leaflets have about six distinct black callose 'lumps' towards the edges and nothing submarginally, whereas in the new species the callose dots are small, orange in colour and are randomly scattered and there is a distinct, very thin, submarginal orange callose line. In *O. petiolulata* the callose region on the sepals is black and confined to two large patches near the apex, whereas in the new species the callose region is orange and submarginal down the sepal just below the thin marginal black zone.

The bulbs in *O. oculifera* are quite different from those in *O. petiolulata*. In the former the bulb is small and ovoid, the tunics splitting with diagonal slits like an inverted V, whereas in the latter they are narrowly ovoid and attenuate with longitudinally splitting tunics.

The leaflets in the new species are very distinctive. They are subparallel, adpressed and partially conduplicate. The glaucous-grey colour of the leaves is very striking in the living material. This is produced by numerous translucent, shortly papillate cells on the upper surface. The remarkable feature is the position of the point of attachment of the leaflet to the petiolule. In *O. petiolulata* the petiolule

is attached at the base of the lamina. In *O. oculifera* the petiole is attached about one quarter of the way along the undersurface of the lamina which is thus semipeltate. In some leaflets the two sides of the basal portion of the lamina are a little more adnate producing a slightly funnel-shaped base to the leaflet.

Salter (1944) noted that he had not seen any living material of *O. petiolulata* but described the flowers as 'deep pink with a purple eye in the throat, tube dull yellow'. F. Bolus (1918) described the corolla from his father's collection as 'purpurea' and Adamson gave 'deep pink with a dark throat' on his label. This would indicate that the corolla was tricoloured with a purple ring at the mouth of the tube which is yellow, quite unlike the very distinctive wine-red tube forming the eye in *O. oculifera*. Salter (1935) when describing his *O. oculata* (= *O. callosa* R. Knuth) gave the colours as 'roseo-rubra..tubo luteo, in faucibus purpureo-annulata' and noted that the dark purple 'eye' in the corolla mouth is a character which he found in some forms of other species, but in *O. callosa* it appeared to be always present. His drawing which was repeated under *O. callosa* (Salter 1944), shows the dark 'eye' as a ring in the mouth of the corolla.

This feature of the red tube was mentioned to Salter when I made the first collection in 1965. I told him I had noted that all the flowers in the population possessed the striking red eye. He remarked that this was unknown to him in the genus and that the material constituted a distinct new species.

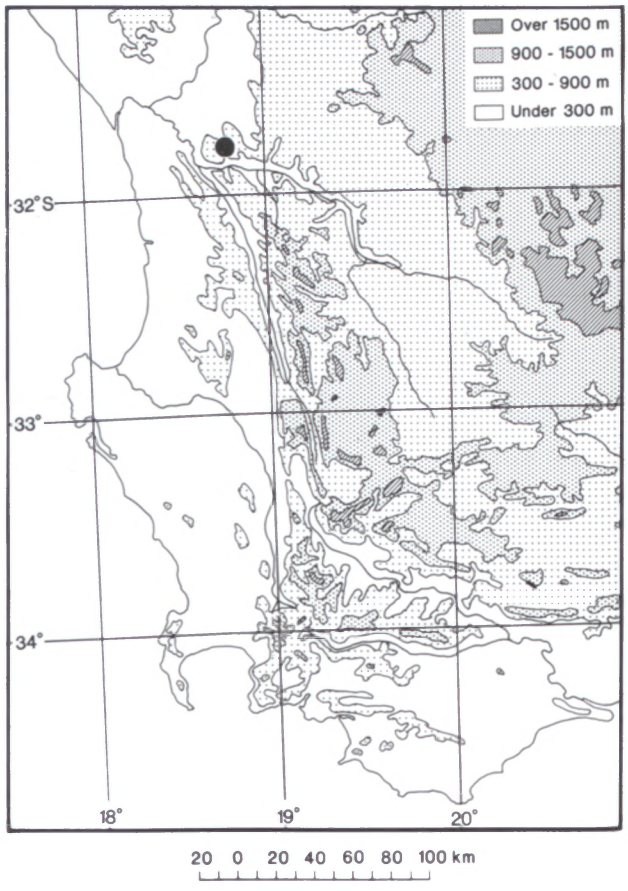

FIGURE 7.—The known distribution of *Oxalis oculifera*.

O. oculifera is confined to one major population and several nearby smaller populations in a small area on the summit of the mountain plateau between the Gifberg and Matsikamma Mountains (Figure 7). I have not been able to locate any other populations, which could very well be found on this extensive range with more intensive searching. The plants occur in shallow gritty sand on quartzitic sheet rock of the Table Mountain Group. The main population grows where water seeps over the rock, in some places as a small streamlet, the plants standing in the shallow water. The plants are dominant, forming pure stands of many individuals or clumps which are a remarkable sight when in full bloom in May and early June, a month after the first autumn rains.

This contrasts with the spring flowering period, September/October, for *O. petiolulata* for the Bolus and Pocock collections. Surprisingly the Adamson collection was collected in flower in May 1933. Pocock recorded her collection as 'growing in marshy places and slowly flowing streams'.

Salter (1944) noted that all the native South African species are trimorphic. He mentioned that overseas workers had recorded that the pollen in *Oxalis* was of different sizes. Salter himself had noted that the colour of the pollen varied but that he had not recorded the details for the South African species. *O. oculifera* is trimorphic within the populations studied and possesses two distinct pollen types (Figure 6E). White larger grains are produced by the middle and uppermost anthers and yellow smaller grains by the lowest set of anthers. This feature raises the intriguing problem of pollen selection in the pollination syndrome of the species. In the wild no insect visitors other than the occasional thrips crawling around in the flower, were observed.

The material studied for this species included living material of *Oliver 9558* flowering in cultivation at Stellenbosch during May 1992.

Specimens examined

O. oculifera

CAPE.—3118 (Vanrhynsdorp): Vanrhynsdorp Dist., Gifberg/Matsikamma area, central plateau W of Van Taakskom near summit of the pass, 595 m, (–DD), 10-06-1965, *Oliver in STE 32028* (PRE, STE, MO); ibid., 12-06-1990, *Oliver 9558* (BOL, K, PRE, STE).

O. petiolulata

CAPE.—3219 (Wuppertal): Clanwilliam, Cedarberg, Krakadouw, 1 000 m, (–AA), 3-05-1933, *Adamson in BOL 20492* (BOL); near Wuppertal and Krakadouw, 1 000 m, (–AA/AC), 8-10-1897, *H. Bolus 8952* (BOL, holo.); Cedarberg, between Middelberg hut and Crystal Pool, 1 220–1 525 m, (–AC), 09-1930, *Pocock s.n.* (BOL).

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