

BULBS ABLAZE



After more than three decades under commercial pine plantations, a fire releases an amazing flowering of bulbs in what can only be described as a miracle of survival.

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We are constantly amazed at the tenacity of some geophytes. Not only can they survive drought and fire, but also more than three decades under commercial pine plantations. This was dramatically demonstrated last summer after the most devastating fire ever to be experienced in the Amatola Mountains near the town of Stutterheim in the Eastern Cape swept through the area in September 2000.

Sudden high winds caused a routine controlled spring burn on adjacent private farmland to spread into SAFCOL's (South African Forest Company) pine plantations on 5 September. Constant high winds and warm weather over the next week made a mockery of all efforts to quell the blaze, and it was only rain on 13 September that eventually put the fire out. Approximately 1600 ha of commercial pine plantation at various stages of maturity, and over 1000 ha of the adjacent mountain grassland, was burned. It is estimated that damage to the plantations amounted to no less than R18 million.

Opposite page *Nerine angulata* blooming seven months after the intense fire in an area that had originally been planted with pines in 1960, felled in 1995 and re-planted with pines in 1996. They had therefore not only survived forty-one years in a pine plantation, but had also experienced a devastating fire so hot that after seven months hardly any other plant or seed had survived. Below left. Rhoda McMaster gazes in disbelief at the many flowering stems of *Cyrtanthus tuckii* var. *viridilobus* that emerged after the fire. Below right *Cyrtanthus tuckii* var. *viridilobus* flowering four weeks after the fire in a pine plantation established fifteen years earlier. Photos: C. McMaster. (Taken with Agfa CT Precisa 200 ASA slide film.)



By fortunate coincidence, we had at this time just been approached by SAFCOL's Environmental Manager, Karen Kirkman, to do a survey of the mountain grassland in the area under the supervision of the Kubusie Forest Station. This unique stretch of grassland, preserved in near pristine condition for more than a century under the former Colonial and Provincial Departments of Forestry, is now being threatened by various factors such as alien invader encroachment and overgrazing by cattle from neighbouring former homeland communities. The area is particularly rich in biodiversity and is important as a water resource for the surrounding communities and urban and industrial areas further away. It is hoped that the survey will establish the richness of the flora and its importance as a repository of the biodiversity of the Afromontane Floristic Region, including medicinal plants used by traditional healers. At the same time it is hoped to establish guidelines for the future management of the mountain grassland and to provide motivation for upgrading the conservation status and formal protection of the area.

The fire, so devastating to the commercial timber industry, provided a great stimulus for the indigenous plant communities in the undisturbed high grassland and the surviving populations scattered in the pine plantations - all of which soon burst into growth and flower. This provided us with an opportunity to record and photograph the flowering species and to observe the effects of the fire on the plant communities. We were able to visit six different sites between Mt. Thomas in the west and Dohne Peak in the east, at least twice a month throughout the summer. We were privileged to observe a complete summer cycle from first shoots to flowering and eventually to fruiting for a wide range of species.

Our first sortie through the burnt-out plantations was on 27 September, almost exactly two weeks after the fire. As we drove up the winding road to Dohne Peak through the charred trees, we were amazed to observe hundreds of *Cyrtanthus tuckii* var *viridilobus* in full flower. The effect of fire as a stimulus for many *Cyrtanthus* species to flower is well known, but we were surprised because we had considered *C. tuckii* to be exceedingly scarce in this area and it was at least a month earlier than its normal flowering time. Above all we were surprised because this plantation block (T5) was planted in 1985, which meant that these bulbs had survived for fifteen years under the pine trees!

Clearly the fire had been a stimulus to flower but, as a result of the fire, sunlight could once again penetrate the trees, the mat of dead pine needles had been consumed and the rain that had put the fire out had restored soil moisture. The flowering was quite spectacular. This was not the first time we had observed the survival of *Cyrtanthus* under pine plantations. In 1995 there was a remarkable blooming of *C. suaveolens* shortly after the felling of a block that had been established thirty-five years previously, but in this case fire was not a factor (see *Veld & Flora* 82(1), p. 32, March 1996). Further up on the burnt mountain plateau we observed thousands of *Cyrtanthus breviflorus* in full flower in the seepages and wet areas – also clearly stimulated by the fire. However, it was interesting to see that *Cyrtanthus suaveolens*, which occurs in the same area, was not stimulated to flower to the same extent and in places where the fire had been particularly hot it seemed that flowering was inhibited and even leaf development was slower. Also in areas where



Gladiolus pubigerus, flowering six weeks after the fire. This little known gladiolus was stimulated to flower profusely in burned pine plantations where it had survived for fifteen years. Photo: C. McMaster. (Taken with Agfa CT Precisa 200 ASA slide film.)

C. tuckii and *C. suaveolens* overlap, the latter flowered sparsely at its usual time at least a month later. This illustrates the fact that not all *Cyrtanthus* species react in the same way to fire.

While *C. tuckii* put on by far the most impressive show after the fire, a number of other bulb species at this particular site had also survived under the pines and were induced to make spectacular growth and eventually flowers. These included *Gladiolus longicollis*, *Gladiolus pubigerus*, a number of *Hypoxis* species, *Dierama igneum* and a small orange *Watsonia* related to *W. pillansii* but as yet of indeterminate species, previously observed only in very localized populations in the high grassland. The fire demonstrated a far wider distribution of this interesting and little known *Watsonia* than had previously been noted. It also appeared that our observation of the inconspicuous but sweetly scented *Gladiolus pubigerus* in the Amatola Mountains was the first record since Thomas Cooper's collection in 1860 in 'British Kaffraria' (see *Gladiolus in southern Africa*, by P. Goldblatt & J.C. Manning, Fernwood Press, 1998).

The effect of the fire on re-growth of the original species in various parts of the plantation varied considerably according to the intensity of the fire. In some blocks, where a second cycle of young pines had been established after a previous felling, a lot of debris and slash had accumulated which resulted in prolonged burning and intense heat. One such area was block D17(b) in the SAFCOL Kubusie plantations where in 1995 we had observed *Cyrtanthus suaveolens* flowering after the felling of thirty-five year old pine trees. Only species with the deepest and toughest bulbs and rootstock survived this fire. It appeared that all seed in the surface layers of the soil were destroyed, as no germination, even of grasses, was apparent throughout the summer that followed. Species that

did eventually re-grow some weeks after the fire included *Cyrtanthus suaveolens*, *Moraea reticulata*, *Eucomis autumnalis*, a large *Albuca* species, *Tulbaghia acutiloba*, *Agapanthus praecox* and *Senecio oxyriifolius*. Flowering in such areas of intense fire was severely inhibited.

One remarkable exception was the late-flowering *Nerine angustifolia* (formerly known as *N. angulata*) that occurs occasionally in dense stands in the high mountain grassland from the Bosberg near Somerset East to the Amatola Mountains at Stutterheim. While not stimulated to flower any earlier by the fire, the conditions following the fire clearly had a positive effect on some relic populations of this spectacular large *Nerine* that had not only survived in the pine plantations for longer than forty years, but also the intense heat of the fire in the second cycle of pines. The sight of the marvellous display of *Nerine* blooms emerging from the blackened soil between the charred logs and stumps on 7 April this year is one I will never forget. The flowers were taller, bigger and more vigorous than I had ever seen them before in their usual grassland habitat and the seed-set was profuse. The bulbs had clearly not been damaged by the heat and with absolutely no

Below left A short, as yet undetermined species of watsonia flowering after fifteen years under pines. The authors have observed these watsonias flowering in three localities between Mt Thomas and Dohne Peak on the eastern spur of the Amatolas. Usually shy to flower, and being so inconspicuous, they seem to have escaped the notice of earlier plant explorers. Below right *Eucomis autumnalis* subsp. *amaryllidifolia* emerging a few weeks after the fire in an area where the heat was so intense that no other species of plants or germinating seed could be seen. Photo: C. McMaster. (Taken with Agfa CT Precisa 200 ASA side film.)



competition since the fire seven months earlier; the bulbs had put on a grand performance.

For the record, this pine plantation had been established in virgin grassland in 1960. Upon maturity in 1995 it was felled and the slash and debris from this felling was not cleared, which is standard forestry practice. Seedling pines were re-established in the slash the following year (1996) and were 2-3 m tall when the fire destroyed them in September 2000. The survival of the nerines through this forty-year period of timber production and the devastating fire that followed is a remarkable testimony to the tenacity and persistence of some of our most beautiful bulbous plants.

It is gratifying to note that as a result of our discoveries of some impressive populations of wildflowers within the Kubusie Forest Station pine plantations after the September fire, SAFCOL has indicated their willingness to set aside areas that are prolific or which support rare species, to remove the pines, and manage them as small reserves. SAFCOL is also making an effort to conserve and maintain the mountain grassland above the pine plantations and the afro-montane forests of the Amatola Mountains. Some outstanding hiking trails have been established, making the floral wealth of the region accessible to all who wish to see it. The trail that commences at the Kologha picnic site near Stutterheim is highly recommended.☺

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