Short Communications

Observations on the natural grafting of *Boscia albitrunca* onto *Colophospermum mopane* and *Combretum imberbe*

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Natural grafting of *Boscia albitrunca* onto *Colophospermum mopane* and *Combretum imberbe* is reported for the first time. Scions of *Boscia albitrunca*, without independent rootstocks, were found at different heights on the main trunk and lateral branches of *C. mopane* and *C. imberbe* stock, indicating no preferential point of establishment. Speculations about possible advantages of such a heterograft are made. An opinion is expressed about the physiological interactions between these heterografts.

Keywords: *Colophospermum mopane, Combretum imberbe, Boscia albitrunca*, Namibia, natural grafting, heterograft.

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Grafting is commonly used in horticulture to enhance growth and other characteristics of certain plant species. The successful establishment and subsequent growth of a graft may sometimes require specific techniques and special stock/scion combinations. Therefore, to find natural grafts of tree species belonging to different families are rare, as was recently observed during a visit to the 'Hobatere Game Lodge', which is situated in the arid north western part of Namibia. On this game ranch, several examples of *Boscia albitrunca* (Burch.) Gilg and Benedict, the Shepherd's tree (Capparaceae), naturally grafted onto *Colophospermum mopane* (Kirk ex Benth.) Kirk ex J. Léonard, mopane (Leguminosae, Caesalpinioideae) and *Combretum imberbe* Wawra, leadwood (Combretaceae), was observed. Stocks were vigorously growing mature trees of *C. mopane* (Figures 1A and 1B) and *C. imberbe* (Figure 3) with fully grown scions of *B. albitrunca*.

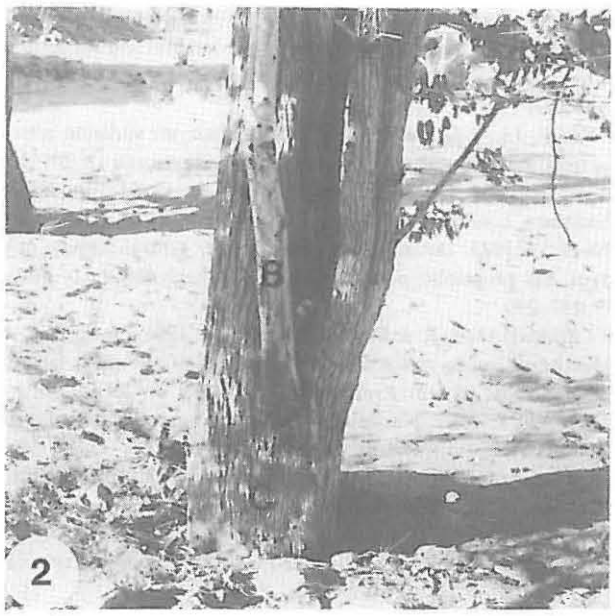

Figure 2 *Boscia albitrunca* (B) scion on main trunk of *Colophospermum mopane* (C).

All three species have a wide distribution in the more arid regions of southern Africa, where they normally grow independently to form an important part in the ecology of the different regions. The successful establishment of these heterografts, and subsequent fusion (Figures 1A and 1B) of the different tissue types of the stock and scion under natural conditions, makes the occurrence of these heterografts remarkable. This is especially so if the slow growth of these particular trees is taken into consideration and the fact that the seed of *B. albitrunca* is leathery - contrary to the sticky seeds of hemi-parasites like *Loranthus* which ensures attachment to host plants.

An establishment micro-habitat could be formed by the deep

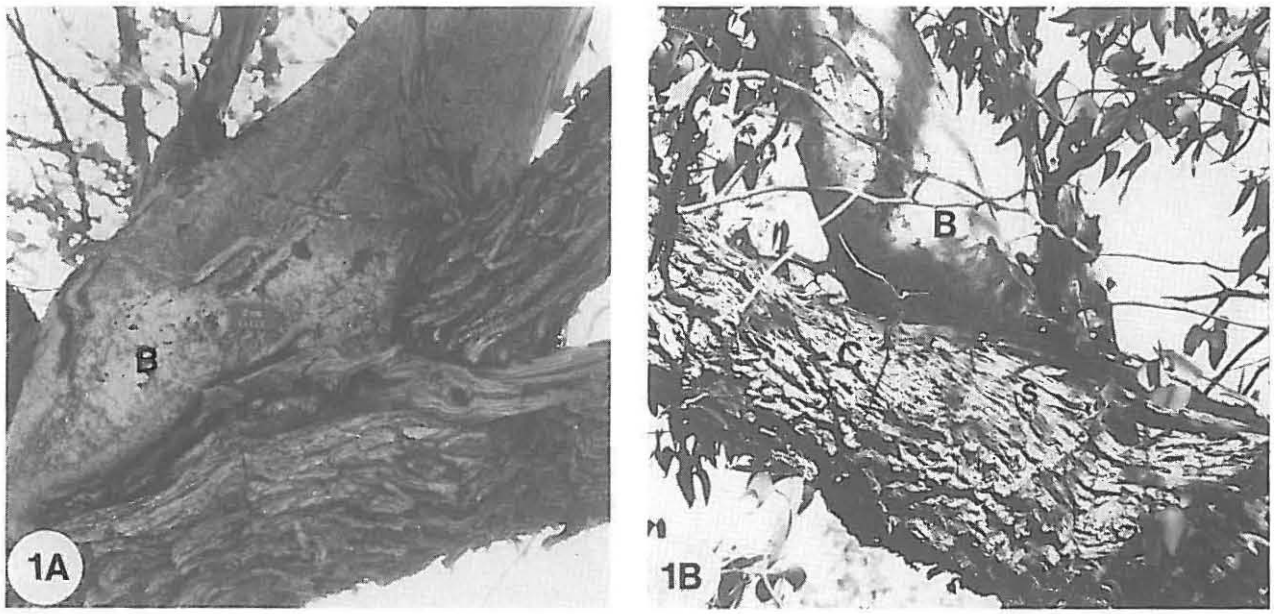

Figure 1 **A**. Fusion region between a scion of *Boscia albitrunca* (B) and stock of *Colophospermum mopane* (C), viewed from outside the canopy of *C. mopane*. **B**. Fusion region between a scion of *Boscia albitrunca* (B) and stock of *Colophospermum mopane* (C), viewed from inside the canopy of *C. mopane*. Considerable production of strengthening tissue (s) visible in the region between the trunk and the graft.

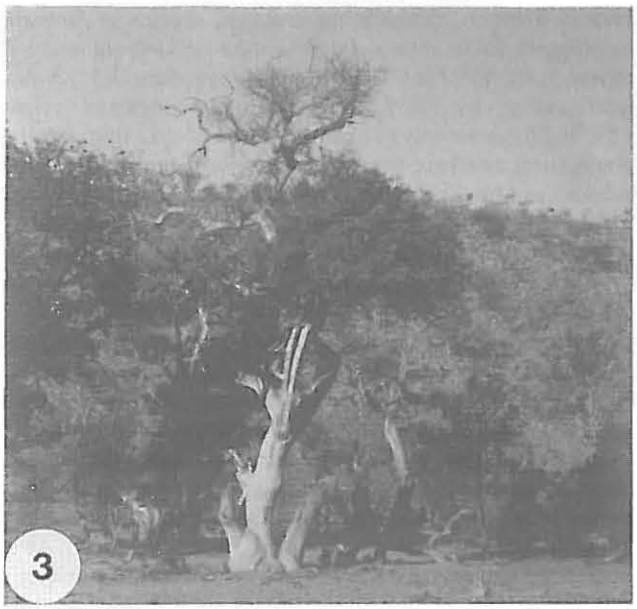

Figure 3 *Boscia albitrunca* scion on main trunk of *Combretum imberbe*. Growth form of *Boscia albitrunca* the result of successive browsing by different animal species to end up with high level browsing by giraffe.

fissures characteristic of mopane bark, resulting in the retainment of *B. albitrunca* seeds and their subsequent germination and establishment. It is unknown why scion seedling roots did not develop a root system which makes contact with the ground, as is the case with some of the epiphytic *Ficus* species. From our initial observations it seems as if establishment of the grafts occurs randomly. Scions of *B. albitrunca* were found at different heights on the main trunk (Figure 2) and lateral branches of *C. mopane* stock (Figures 1A and 1B). Besides other future studies, an anatomical study of the tissue fusion region between scion and stock will be undertaken to confirm our observations. Obvious differences in the amount of strengthening tissue (Figure 1B) formed in the region between the main trunk and the graft were observed, compared to the natural condition of the region from the graft towards the tip of the side branch.

Some speculations about the physiological interactions between the *C. mopane* and *B. albitrunca* heterograft can be made. *Colophospermum mopane*, for example, is deciduous and *B. albitrunca* evergreen. During the leafless period (July–October) of the mopane's phenological cycle, photosynthetic products from the *B. albitrunca* scion might be of benefit to the root system of the *C. mopane* stock, compared with ungrafted dormant *C. mopane* trees. On the other hand, such a graft results in continued water loss, even during dry periods. When the *C. mopane* stock is covered with leaves during the growing season, the *B. albitrunca* scion could additionally benefit from the sizeable leaf area of the graft in terms of the availability of photosynthetic products. Smit (1994) calculated that a 1,5 m high *C. mopane* tree, has a mean leaf volume of 491,6 cm^3.

An advantage to the *B. albitrunca* scion could be the availability of the dense but shallow (primarily concentrated in the first 400 mm layer of soil) root system of *C. mopane*, with an average biomass exceeding 17 $tDWh^{-1}$ (Smit 1994). This root layer ensures efficient uptake of water from the soil, even from small rainfall events. Deeply penetrating larger roots (exceeding depths of 8 m at Hobatere Game Lodge) ensure the uptake of water from the underground water table during annual dry spells and periods of drought. The ability of the root system of *C. mopane* to extract water from the soil at a water potential below that available to grass species is well known (Smit 1994)

Besides physiological advantages, alleviation from browsing pressure might be of advantage to the *B. albitrunca* scion, as it is one of the tree species that is heavily browsed by game throughout the year. An increase in bowl height of *B. albitrunca* due to grafting onto host species may thus be an added advantage for the successful survival of the tree. It will be interesting to know whether the individual members of the heterografts described above show any changes in the chemical composition of the different parts of the tree, compared to ungrafted plants. These observations create the possibility for a number of ecological, anatomical and silvicultural studies.

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Reference

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Screening of South African lichens for prostaglandin-synthesis inhibitors

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Ethanolic extracts from 12 lichen species collected in southern Africa were screened for prostaglandin-synthesis inhibitors using the cyclooxygenase bioassay. Highest inhibitory activity was obtained with extracts of *Pseudocyphellaria aurata* and species of *Parmelia*.

Keywords: Bioactivity, cyclooxygenase, prostaglandin-synthesis inhibitors, lichens.

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South Africa has a rich flora of lichens that are widely distributed throughout the country. Lichens produce many unusual secondary products which are not found in higher plants (Culberson & Kristinsson 1970). Lichens have been used in folk medicine for thousands of years in areas as far apart as Europe, Egypt, North America, China and Malaysia. Iceland moss, *Cetraria islandica*, is still included in many pharmacopoeias. Iceland moss is generally used for pulmonary tuberculosis and antibiotic activity has been demonstrated for this lichen as well as a number of other species (Vartia 1973).

We have previously screened Zulu medicinal plants (Jäger *et al.* 1996; McGaw *et al.* 1997) and South African seaweeds (Stirk *et al.* 1996) for inhibitors of prostaglandin-synthesis. In the