

Notes on some aspects of the ecology of *Kirkia dewinteri* Merxm. & Heine, (Kaoko Syringa) from the Kunene Region, Namibia

P.L. Cunningham¹, W. Adank¹ & A. Esterhuizen²

¹School of Natural Resources and Tourism, Department of Nature Conservation, Polytechnic of Namibia, Private Bag 13388, Windhoek, Namibia

²IRDNC, Windhoek, Namibia

Abstract

The Kaoko Syringa, Kirkia dewinteri Merxm. & Heine, is endemic to Namibia and confirmed from only a few locations mainly on dolomite outcrops in the northwestern part of Namibia. One population visited consisted of approximately 120 multi-stemmed individuals with a mean height and mean circumference of 4.49±1.86 m and 54.68±38.01 cm, respectively. The mean distance between individuals is 7.96±5.64 m. Flowering occurs during early September.

Keywords: *Kirkia dewinteri*; Kaoko Syringa, ecology, Namibia

Introduction

Kirkia dewinteri belongs to the genus *Kirkia* (Simaroubaceae family) that includes two other species, *Kirkia acuminata* Oliver (White syringa) and *Kirkia wilmsii* Engl. (Mountain syringa), of which *K. acuminata* also occurs in Namibia, in the mountainous north central and northwestern parts, and is the most widespread (Coates Palgrave, 1983; Van Wyk & Van Wyk, 1997). The genus was named after Sir John Kirk, explorer and companion, for a time, of Livingstone (Palmer & Pitman, 1961). *Kirkia dewinteri* is endemic to Namibia (Anon, n.d.; Craven, 1999) and classified as rare (Palgrave, 1983) and vulnerable (IUCN, 2002) and included as a red data book species (Craven, 1999). Its general habitat is described as occurring on rocky dolomite outcrops in the Kaokoveld (IUCN, 2002; Van Wyk & Van Wyk, 1997). *K. dewinteri* are currently known from only a few locations in the general Sesfontein area – Joubert Pass, east of Warmquelle and the Khowarib Schlucht – as well as from one location in the Tsumeb/Kombat area (NBRI database).

According to Palgrave (1983) and Van Wyk & Van Wyk (1997) the most distinguishing feature of this tree is the yellow bark with blackish spots (“leopard like”) and its isolation. The growth form of the leaves, flowers and fruit could generally be described as typical of *Kirkia* although nothing is known regarding the

flowering and fruiting time (Palgrave, 1983). The most distinguishing characteristic to distinguish *K. dewinteri* from either *K. acuminata* or *K. wilmsii*, other than the bark and its isolation, is the fruit, which splits into 8 valves rather than the 4 valves known from the other two species.

Other than information on the general description of this tree very little is known regarding this species. This note comments on some aspects of the growth and ecology of *K. dewinteri*.

Methods

A study on one *K. dewinteri* population from the Joubert Pass area was conducted on 4 September 2003 by 2nd year Nature Conservation students and staff.

Sixty five individual trees – estimated as approximately half the total population – were measured with regards to height (m), circumference (cm), distance to closest other *K. dewinteri* individual (m) and reproductive status (flowering or non-flowering).

A measuring pole was used to determine the height while a soft measuring tape was used to determine the circumference of the largest stem at 30 cm above ground level. Distance between individuals (i.e. nearest neighbour) was measured with a 30 m measuring tape. A Garmin GPS II was used to estimate the area (i.e. distance between the two outermost individual trees) of the population. Data was captured on a spreadsheet for further analysis.

Results

The area in which the population is located is 440 m x 150 m or 6.6 ha (main population) in extent on a dolomite outcrop at the apex of Joubert Pass (18°54'S, 13°46'E; Elevation: 1445 m) close to the village of Otjomatempa ±110 km due south of Opuwo in the Kunene Region in northwest Namibia (Figure 1). No other population of *K. dewinteri* trees is known from the immediate area. This was confirmed by physically investigating adjacent dolomite outcrops in the immediate vicinity.

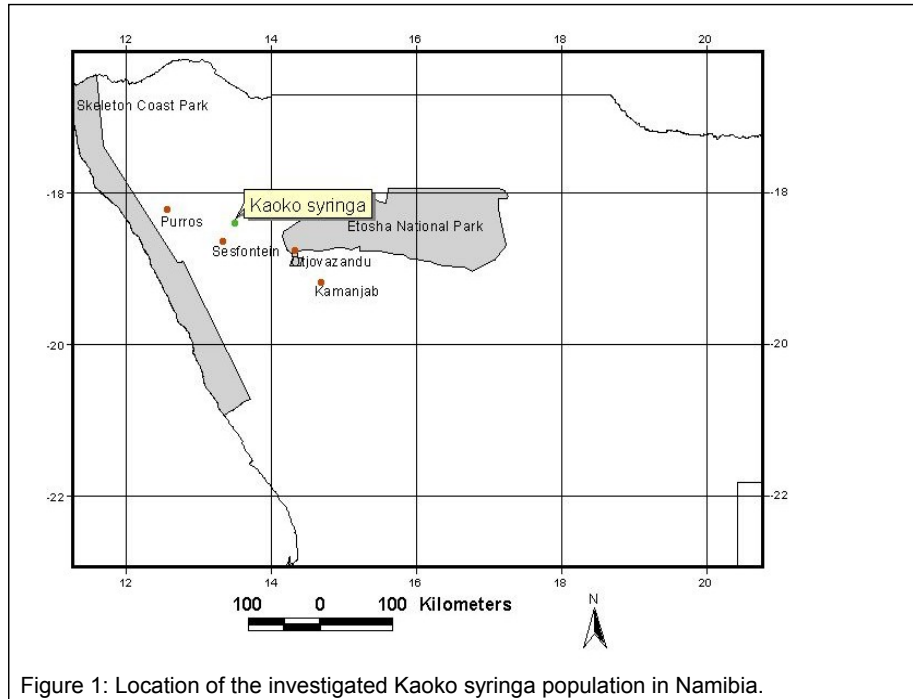


Figure 1: Location of the investigated *Kaoko syringa* population in Namibia.

After counting and taking measurements of 65 individual trees, a rough count was made of the remaining trees to estimate the total population. This resulted in a count of approximately 120 individual trees (main population) with three *K. dewinteri* individuals located on an extension of the dolomite hill just south of the main population. For all practical purposes the total population of *K. dewinteri* occurs on one dolomite outcrop in the Joubert Pass area.

Measurements of 65 *K. dewinteri* trees resulted in a mean height and mean circumference of 4.49 ± 1.86 m (Range: 1.75-8 m) and 54.68 ± 38.01 cm (Range: 9-190 cm), respectively. A relatively strong positive correlation ($r^2=0.656$) exists between height and circumference (Figure 2). The mean distance between *K. dewinteri* trees was determined as 7.96 ± 5.64 m.

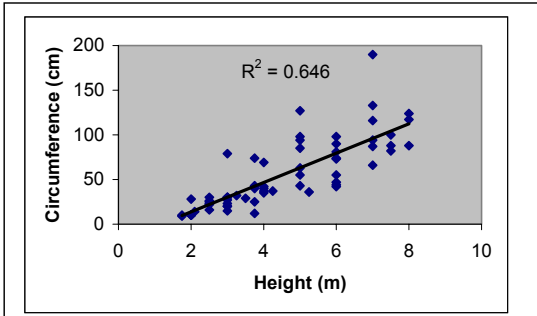


Figure 2: Correlation between the height and circumference of *K. dewinteri* (N=65) trees from northwest Namibia.

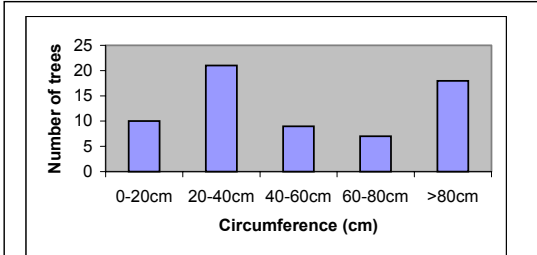


Figure 3: Circumference classes of *K. dewinteri* (N=65) trees from northwest Namibia.

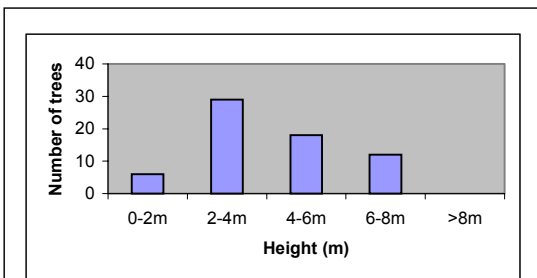


Figure 4: Height classes of *K. dewinteri* (N=65) trees from northwest Namibia.

The majority of the trees fall within the circumference classes of 20-40 cm (32%) and >80 cm (28%) with the dominant height class within 2-4 m (45%) (Figures 3 & 4).

Flowering and leaf formation was observed on two occasions (2002 & 2003) during early September by the authors (Figure 5). Flowering has previously been documented for January, February, August and October but mainly November for this species (NBRI database). Although the authors did not observe fruiting the NBRI database have documented seed for March, May and July.

The bark is yellowish in colour with a speckling of grey/black flecks or dots giving it a mottled appearance (Figure 6). The bark is thick – approximately 10 mm – as determined from one fallen branch. The wood is light in colour with sapwood dominating. The growth rate seems slow as indicated by year rings observed from one fallen trees. The majority of the trees are multi-stemmed, branching after emerging from the ground.



Figure 5: Flowers of *Kirkia dewinteri*

Discussion

The total population estimate of 120 trees found in an area of 6.6 ha on one dolomite outcrop for the entire population of *K. dewinteri* indicates an urgent need to protect this specific site. Although the general location is isolated, inhospitable and unfamiliar to most people, uncontrolled fire and lack of knowledge (uncontrolled utilization of trees in the area) could see this population being decimated accidentally. It is even more disconcerting to know that this population occurs close to a fairly major road. The Kaokoveld is known to have a high floristic individuality (Maggs, 1998) while the Sesfontein-Orunama Mountain area has been identified as a biodiversity hotspot although it does not have formal conservation status (Anon, n.d.). *K. dewinteri* occur in a few other isolated spots in the general Sesfontein area (NBRI database) while the IUCN (2002) indicates another (unconfirmed) population further to the east.

The majority of *K. dewinteri* trees (N=65) fall within the circumference classes of 20-40 cm and >80 cm (32% & 28%) possibly indicating an old – original – generation of trees (>80 cm) and a second younger generation of trees (20-40 cm). This is reflected in the height classes where the majority of trees fall within the 2-4 m (45%) height class with 73% of the trees falling within the 2-6 m height classes. The 0-2 m height class is slightly underrepresented as juvenile plants of <0.5 m were excluded since



Figure 6: Habitus of *Kirkia dewinteri*

their survival is not assured and only three individuals were observed. Overall, this *K. dewinteri* population is in a healthy condition as reflected in the height and circumference classes.

Fire probably plays a very important role in the distribution and survival of this species as indicated by its habitat (limited to a very rocky outcrop, mainly devoid of grasses). It is unclear if the thickness of the bark indicates an adaptation to fire or something else. No trees were observed away from the relative protection of the rocky areas with none located between the dolomite outcrops, which have a higher fuel (grass) load. Fires occur on an annual basis in the vicinity (pers. obs.). The lower grass cover results in

no/low fire intensity, which is probably favourable for the tree. Its association with fire would however have to be investigated further.

Flowering time not previously known (Palgrave, 1983) is confirmed for early September (2002 & 2003 – this study) with November records dominating the NBRI database. Fruiting although not observed during 2002 and 2003 is confirmed for March, May and July (NBRI database). A handful of small *K. dewinteri* trees, albeit with bonsai attributes, were observed growing in extremely inaccessible rocky crevices in the area. A few small *K. dewinteri* trees were observed with bark damage, similar to gnaw marks, which could be the result of Jameson's red rock rabbit (*Pronolagus randensis*), two specimens of which were observed fleeing the area whilst we were conducting fieldwork. These rabbits would also possibly affect the survival of seedlings. Apart from Jameson's red rock rabbit browse damage and some unidentified insect damage to the bark, it is not known what other species would utilize this tree as a source of food. The location of this species would make it

difficult for giraffe and elephant to reach it, but this possibility is not excluded especially for the lower lying individual trees. No bird nests were observed in any of the trees and it is suspected that the growth form does not lend itself to nest construction.

The mean distance of 7.96 ± 5.64 m between *K. dewinteri* individuals is rather dense and possibly the reason why so few other tree species occur on this specific dolomite outcrop. Other plants growing in the immediate vicinity of this *K. dewinteri* population include a few *Sterculia africana* and *Kirkia acuminata* (lower down the slope) individuals. The resurrection plant (*Myrothamnus flabellifolius*) is the dominant forb while grasses are sparsely represented.

The role that fires and the immediate geology have on the distribution and survival of this species would have to be investigated further. Habitat loss and/or degradation through agriculture and infrastructure development could further threaten this species. Geologists in the area would also have to take the location of this endemic tree species into consideration before commencing any exploratory work. We suggest that this site receive protection so as to ensure the survival of this little known tree species.

Acknowledgements

Our sincere appreciation goes to the group of 2nd year Nature Conservation students who conducted the fieldwork, Nicky Knox (Department of Land Management, Polytechnic of Namibia) for the distribution map, staff of the Integrated Rural Development for Nature Conservation (IRDNC) for accompanying and assisting us and the National Botanical Research Institute (NBRI), especially Esmeralda Klaassen, for access to their database.

References

- ANON, n.d. Environmental Forestry: Strategic forests in Namibia. Environmental Forestry Component, Namibia Finland Forestry Program, Directorate of Forestry, Namibia.
- CRAVEN, P. (ed) 1999. A checklist of Namibian plant species. Southern African Botanical Diversity Network Report No. 7, November 1999. 204pp.
- IUCN, 2002. 2002 IUCN Red List of Threatened Species. <http://www.redlist.org>.
- MAGGS, G.L. 1998. Plant diversity in Namibia. In: Barnard, P. (ed). Biological diversity in Namibia: a country study. Namibian National Biodiversity Task Force, Windhoek. 332pp.

- COATES PALGRAVE, K.C. 1983. Trees of Southern Africa. Struik Publishers, South Africa. 959pp.
- PALMER, E. & PITMAN, N. 1961. Trees of South Africa. A.A. Balkema, Cape Town. 352pp.
- VAN WYK, B. & VAN WYK, P. 1997. Field Guide to trees of Southern Africa. Struik Publishers, South Africa. 536pp.