

FIG. 11.—Flowers of *Kirkia wilmsii*, $\times 6$: 1, male; 2, female.

population I know of is at the Pyramids, near Onderstepoort, about 15 km north of the Botanical Garden.

Flowering season

The date of commencement of the flowering season varied slightly, and was probably affected by the weather. In 1981 the first flowers opened in the 1st and 2nd week of November but, in 1982, which had a milder and less frosty winter, anthesis occurred in the 3rd and 4th week of October. This effect may be enhanced by the fact that the trees are growing outside the natural range of the species. The average duration of flowering during both years was 35–(37)–39 days, with one specimen flowering for an abnormal 14 days in 1982. Again, this may differ in warmer areas.

Whether or not a tree flowers, appears to depend on its size, but even large trees may not flower for a season, or the inflorescences may die off soon after being produced. It was also observed a number of times that a tree would produce no flowers for as long as eight days, then continue with the flowering cycle as before.

Flower sex

When specimens of *K. wilmsii* are seen in the herbarium, the species appears dioecious, with only male or female flowers apparently present on a given specimen. However, if nearly mature buds are opened, it can be seen that they are always of the opposite sex to the open flowers. It was decided to observe the trees themselves and record the sex of open flowers daily during the flowering season.

The flowers themselves were always unisexual, and I have so far not seen one which could be

considered hermaphrodite. The male flowers have large anthers, long filaments, and a gynoecium reduced to no more than a small pyramid of tissue in the centre of a well-developed, nectiferous disc. Female flowers, on the other hand, have a well-developed gynoecium with four long, fused styles and four fused, globular stigmas, and the anthers are reduced and sterile with short filaments. Both filaments and anthers in female flowers are about $\frac{1}{3}$ of the size of those in male flowers (Fig. 11).

Every tree produced flowers of both sexes, but usually flowers of only one sex were open at any one time on a given tree. When buds were examined, it was found that the older buds were of the opposite sex to the open flowers, and the younger buds were of the opposite sex to the older buds. These open in successive flushes, so that the tree, which is morphologically monoecious, is functionally dioecious. It would be most interesting to follow up the physiology and see what changes trigger the development of flowers into either male or female.

Some overlap may occasionally occur, but usually a tree which appeared completely male one day will change to female overnight. Often where it seemed that flowers of different sexes were overlapping in time, it was found that either the female flowers had blackened, probably non-receptive stigmas, or that the male flowers had shed their pollen.

In this way, outcrossing is ensured, but each individual tree still produces seed. The length of time each flush of flowers remains open is very irregular, thus staggering the presence of different sexes even in a very small population.

No tendency was observed, either within the species as a whole or on one tree, for either male or female flowers to open first in the season. The length of time flowers of a sex remained open varied greatly, with each flush of female flowers lasting 3–(6)–12 days, and of male 4–(13)–17 days. (Number in brackets is the mean.) The flush of male flowers tended to last longer than the female. This change of sex occurred 3–6 times in each season (Fig. 12).

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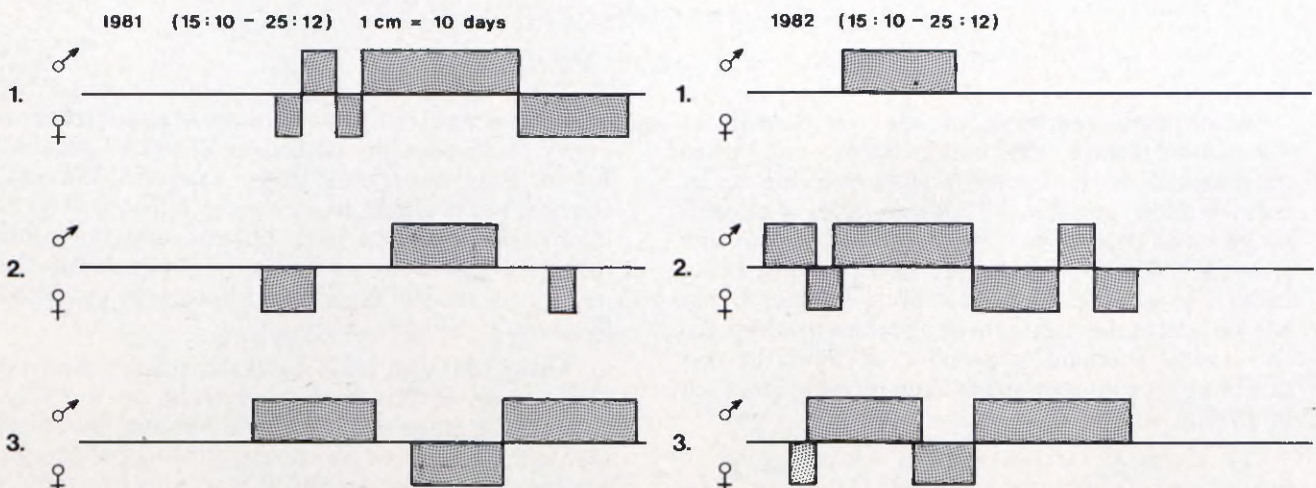


FIG. 12.—Duration of flowering of either sex in *Kirkia wilmsii*.