

A Note on the *Acacia giraffae* x *A. haematoxylon* Hybrid

by

J. H. Ross

ABSTRACT

Over twenty years ago the first specimens of a hybrid between *Acacia giraffae* Willd. and *A. haematoxylon* Willd. were collected in the Hay district of the Cape Province. From an examination of all available herbarium specimens the characteristics of *A. giraffae*, *A. haematoxylon*, and the hybrid are tabulated. Some of the characters displayed by the hybrid, for example number of pinna pairs, are found to be intermediate between the values recorded for the parent species, while other characters, for example the degree of pubescence and the presence of glands, tend to be inherited from one parent species only. It appears, therefore, that there is a marked tendency for certain characters associated together in a parent to be associated in the hybrid.

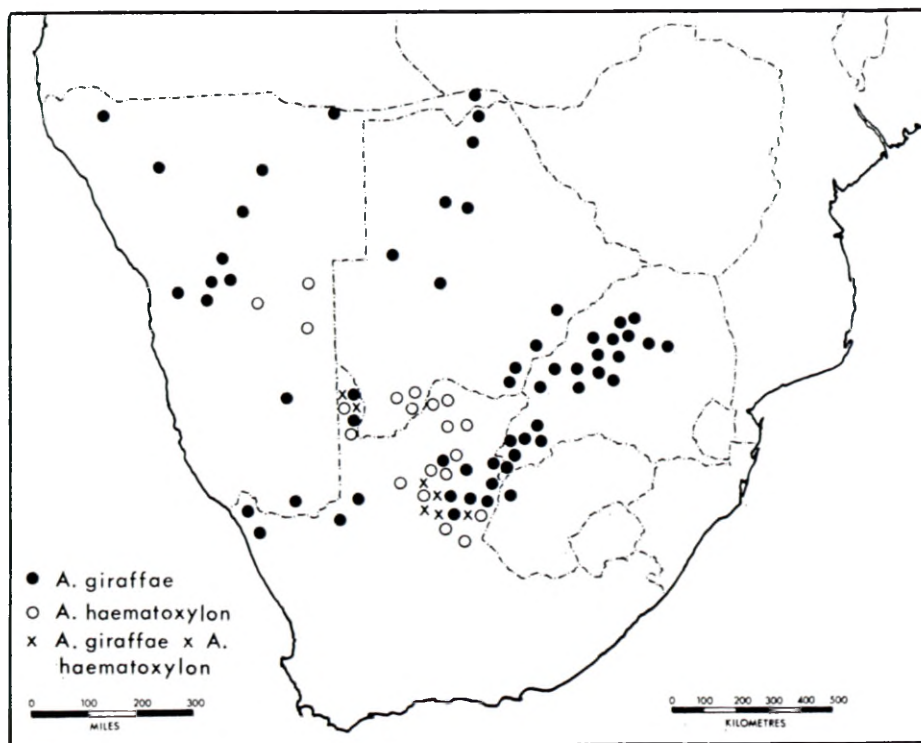


FIG. 1.—The known distribution of *Acacia giraffae*, *A. haematoxylon* and *A. giraffae* x *A. haematoxylon*, based on an examination of herbarium specimens.

Over twenty years ago the first specimens of a remarkable *Acacia* were collected in the Hay district of the Cape Province by Mr. J. P. H. Acocks (No. 12689) and Dr. L. E. Codd (No. 1261). The collectors noted that the plant exhibited characteristics of *A. giraffae* Willd. and of *A. haematoxylon* Willd. and concluded that it was in all probability a hybrid between the two species. A number of specimens have been collected subsequently from other localities in the Cape Province and these have all lent support to the idea that the plants are hybrids between *A. giraffae* and *A. haematoxylon*. Leistner in Mem. Bot. Surv. S.Afr. 38 : 67 (1967) noted: "In river areas where *Acacia giraffae* and *A. haematoxylon* form mixed stands, especially in the lower Auob and Nossob, a tree is occasionally encountered (Plate 24), which is regarded as a hybrid between the two species." Evidence suggests that although the hybrid plants are relatively widespread they are nowhere common. Usually only a solitary plant is found or at the most five or six individuals.

It is now proposed to examine the relevant characteristics of *A. giraffae*, of *A. haematoxylon*, and of the hybrid to determine the position that the last-named occupies in relation to the two species and, if possible, to attempt to establish some of the characters which each parent contributes. The information given in Table 1 has been compiled from an examination of all available herbarium specimens. Seventy-six specimens of *A. giraffae*, 35 of *A. haematoxylon*, and 15 of the hybrid were examined.

The hybrid has the spreading, rather weeping habit of *A. giraffae* and the bark resembles that of *A. giraffae*, while the foliage is greyish and resembles that of *A. haematoxylon*.

Leaflet size tends to be almost intermediate between that of *A. giraffae* and *A. haematoxylon*. The leaflets are not tightly compressed laterally as in *A. haematoxylon* and so do not appear as though simply pinnate. The hybrid plants are not uniform in regard to leaflet size as some have decidedly larger leaflets than others. There is, therefore, a small but readily apparent range in leaflet size within the hybrid complex. For example, *Acocks 12689* (PRE) is typical of the one extreme with large leaflets and *Leistner 1340* (KMG, PRE) is typical of the other extreme with smaller leaflets. *Leistner 1728* (KMG, PRE) is almost intermediate in size between the two extremes.

Leaflets in the hybrid are sparingly to densely puberulous as in *A. haematoxylon* which is in sharp contrast to the glabrous leaflets of *A. giraffae*. Likewise, in contrast to *A. giraffae*, the petiole, rachides and rachillae are densely puberulous and have numerous minute scattered reddish glands as in *A. haematoxylon*.

A. giraffae has (1-) 2-3 (-6) pinna pairs, *A. haematoxylon* (6-) 12-20 (-22) and the hybrid (3-) 7-11 (-12) pairs. Thus the number of pinna pairs in the hybrid is intermediate between the values recorded for the parent species. Similar results were obtained by Moffett in *Heredity* 20 : 621-629 (1965) who found that the number of pinna pairs in hybrids between *A. irrorata* Sieb. ex Spreng. and *A. mearnsii* De Wild. was "approximately midway between the parent species values, . . ." This behaviour was also very similar to that found in hybrids between *A. decurrens* (Wendl.) Willd. and *A. mearnsii* by Moffett and Nixon in *Heredity* 12 : 199-212 (1958).

Inflorescences in the hybrid are grey in bud as in *A. haematoxylon* owing to the dense grey pubescence on the corolla lobes, whereas in *A. giraffae* the buds are yellow. As opposed to the glabrous, eglandular peduncle of *A. giraffae*,

TABLE 1. — Synopsis of differences between *A. giraffae* Willd., *A. haematoxylon* Willd., and *A. giraffae* x *A. haematoxylon*.

<i>A. giraffae</i>	<i>A. giraffae</i> × <i>A. haematoxylon</i>	<i>A. haematoxylon</i>
Stipular spines usually fused basally, often inflated into rounded "ant-galls" up to 2.5 cm in diameter, tapering apically.	Stipular spines ± straight, usually slightly stouter than in <i>A. haematoxylon</i> , not fused basally	Stipular spines ± straight, slender, not fused basally
Foliage dark green	Foliage greyish	Foliage greyish
Petiole 4-14 mm long, glabrous or subglabrous	Petiole 2-9 mm long, densely grey tomentose, with minute scattered glands	Petiole 1-5 mm long, densely grey tomentose, with minute scattered glands
Rachis 0-5.5 (0.7-2.7) cm long, glabrous or subglabrous	Rachis 0.9-4.8 (2.0-4.4) cm long, densely grey tomentose, with minute, scattered glands	Rachis 0.8-5.1 (1.9-3.7) cm long, densely grey tomentose, with minute scattered glands
Pinnae 1-6 (2-3) pairs	Pinnae 3-12 (7-11) pairs	Pinnae 6-22 (12-20) pairs
Rachillae 1.3-4.2 (1.6-3.2) cm long, glabrous or subglabrous	Rachillae 0.4-2.2 (1.4-2.0) cm long, densely grey tomentose, with minute scattered glands	Rachillae 0.3-1.0 (0.5-0.8) cm long, densely grey tomentose, with minute scattered glands
Leaflets 7-18 (9-12) pairs, 4-11.5 (8.1 ± 2.0) mm long, 0.7-2.4 (1.5 ± 0.3) mm wide, linear to linear-oblongate, glabrous	Leaflets 11-25 (15-22) pairs, 1-4 mm long, 0.4-1.1 mm wide, linear to linear-oblong, often slightly falcate, sparingly to densely puberulous	Leaflets 12-24 (14-21) pairs, up to 0.8 mm long, 0.4 mm wide, very tightly compressed laterally, superficially appearing simply pinnate, oblong, densely puberulous
Peduncle 1.8-5.5 (3.1 ± 0.8) cm long, glabrous or subglabrous	Peduncle 1-3 cm long, densely grey puberulous	Peduncle 1.0-2.4 cm long, densely grey puberulous
Involucel apical	Involucel apical	Involucel apical
Calyx 1.5-2.8 mm long, apices of lobes glabrous or sometimes with few glandular hairs	Calyx 1.8-2.4 mm long, apices of lobes sparingly to densely pubescent	Calyx 1.4-1.9 mm long, apices of lobes sparingly to densely pubescent
Corolla 2.7-3.6 mm long, glabrous or apices of lobes with few glandular hairs	Corolla 2.2-3.0 mm long, apices of lobes sparingly to densely pubescent	Corolla 1.8-2.6 mm long, apices of lobes sparingly to densely pubescent
Stamen filaments to 7.5 mm long, often connate into groups basally	Stamen filaments to 4 mm long, often connate into groups basally	Stamen filaments to 4.5 mm long, often connate into groups basally
Ovary sessile	Ovary sessile	Ovary sessile
Legume semi-lunate or sub-orbicular, sometimes curled into almost a complete circle, woody, not umbonate over the seeds, 6-13 cm long, 1.8-5.0 cm wide, 0.8-2.0 cm thick	Legume falcate or curled into a complete circle, margin irregular, often constricted between the seeds and ± moniliform, umbonate over the seeds, 7-14 cm long, 1.2-2.3 cm wide, up to 1 cm thick	Legume linear, falcate or curled into a complete circle, margin entire or irregularly constricted between the seeds and ± moniliform, umbonate over the seeds, 8-21 cm long, 0.6-1.4 cm wide, up to 0.9 cm thick
Seeds 10-14 mm x 8-10 mm	Seeds 9-12 mm x 6-8 mm	Seeds 8.5-11.5 mm x 6.5-9 mm
Areole 6-9 mm x 3.5-5.5 mm, ± closed	Areole 6-8 mm x 2.5-3.5 mm, ± closed	Areole 5-7 mm x 3.5-5 mm, ± closed

peduncles are sparingly to densely puberulous and glandular. The stamen filaments in *A. giraffae* and in *A. haematoxylon* are sometimes connate into groups basally, whereas in the hybrid the degree of fusion is sometimes greater than in either parent.

Pods of the hybrid are almost intermediate in width between those of *A. giraffae* and those of *A. haematoxylon*.

Although the parentage of the hybrid is known, it is not known which species functions as the male parent and which as the female. Furthermore, it is not known whether the same species is always, for example, the male parent or whether the same species may sometimes serve as the female parent. Consequently there is at present no understanding of differences arising in the progeny as a result of this. As the hybrid is fertile it should be possible to find all stages of back-crossing with the parents. Careful field studies are necessary to resolve these problems. A few plants grown from seed of a hybrid tree have been established on the National Botanic Garden, Pretoria.

Thus it may be seen that some of the characters displayed by the hybrid, for example number of pinna pairs and leaflet size, are intermediate between the values of *A. giraffae* and those of *A. haematoxylon*, while other characters, for example the degree of pubescence and the presence of glands, are those exhibited by a single parent, namely *A. haematoxylon*. The hybrids are usually as densely pubescent and as glandular as *A. haematoxylon* and are not only sparingly pubescent as an intermediate state between glabrous *A. giraffae* and densely pubescent *A. haematoxylon*. Recombination of the characters of the two parent species apparently does not take place at random, but there is a marked tendency for characters associated together in one species to remain associated in the hybrid. The multifactorial genes tend, therefore, to be linked together in the hybrid in the same way as they were in the parents, certain combinations perhaps being favoured by natural selection. As in the case of *A. haematoxylon* and the hybrid, the presence of glands and the degree of pubescence were also found (Ross in *Webbia* 22 : 203-223, 1967) to be correlated in *A. caffra* (Thunb.) Willd., the greater the degree of pubescence the more numerous the glands.

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