

# Hidden in plain view: First UAE record of the wadi grass *Saccharum kajkaiense* and notes on its distribution in the UAE and neighbouring Oman

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The genus *Saccharum* (SAK-er-um) consists of some 200 species, subspecies, varieties and/or cultivars including the cultivated sugar cane, *S. officinarum* (eFloras 2009; ZipcodeZoo.com 2009). In the UAE and northern Oman the genus is represented principally by the conspicuous *S. ravennae*, which grows in large clumps in and alongside gravel wadi beds. The clumps can be more than 2 metres tall, with the plumed inflorescence on spikes up to another metre taller.

*S. ravennae* has an Old World temperate and tropical distribution ranging from the circum-Mediterranean region through the Caucasus and Arabia to Central Asia, China, India and Indo-China (Clayton *et al.* 2006 onwards). It has also been introduced as an ornamental in the United States, where, under names such as "Ravenna Grass", "Hardy Pampas Grass" and "Plume Grass", it is advertised for its large size, distinctive appearance and large plumose inflorescence as one of the most attractive decorative grasses, although it is considered moderately invasive.

Two other sugar cane congeners have been mentioned in earlier literature for the UAE and northern Oman. *S. griffithii*, which has a primarily South Asian distribution (Clayton *et al.* 2006 onwards), has been recorded in the UAE from anthropogenic sites in Abu Dhabi and at Al-Wigan, in the south-eastern desert (Jongbloed 2003). *S. spontaneum*, sometimes called "Kans Grass" or "Wild Sugar Cane", is an invasive species which is considered to have a South Asian origin but is now widely distributed in the Old World (Clayton *et al.* 2006 onwards). It was recorded from northern Oman (Ghazanfar 1992) and from an unspecified wadi site in the UAE or neighbouring Oman (Jongbloed 2003).

Both *S. griffithii* and *S. spontaneum* are, like *S. ravennae*, potentially very large plants, and both are typically associated with relatively damp conditions, whether natural or irrigated. *S. spontaneum*, for example, forms thick stands on alluvial plains along South Asian rivers which flood seasonally (Wikipedia 2009). It also grows, spontaneously, in damp fields and is considered excellent fodder for most South Asian livestock.

The UAE and northern Oman records of *S. spontaneum* have subsequently been revised, as discussed below, but in any case the prior records other than *S. ravennae* were generally treated as exceptional and there is no evidence that the significant presence of any other *Saccharum* species in Hajar Mountain wadis was recognised or suspected by most of the many field investigators in the UAE and northernmost Oman (see, e.g., Western 1989, Boer & Chaudhary 1999, Curtis 1999, Karim 2002, Jongbloed 2003, and Karim & Fawzi 2007).

Nevertheless, another regional congener, *Saccharum kajkaiense* (Meld.) Meld., had in fact been recorded by the mid-1990s, when lepidopterist Matthew Cock obtained an identification from Thomas Cope at the

Royal Botanical Gardens, Kew, for the grass species on which Cock had collected larvae of the Millet Skipper butterfly *Pelopidas thrax* (Cock 2008/2009, in this volume) at several locations in Wadi Qahfi (the locally popular "Hatta Pools" wadi), situated in the middle of the Hajar Mountains in northernmost Oman. Cope was able to comment at that time that *S. kajkaiense* was found in Iran and Afghanistan and had a localised distribution in northern Oman (the type specimen is from Iran and the species is also found in the North West Frontier Provinces of Pakistan (eFloras 2009)). Cock himself had not distinguished between *S. ravennae* and *S. kajkaiense*, considering that only a single species was present (which he understood to be *S. kajkaiense*), but he did observe that *P. thrax* larvae were more common on smaller plants near the wadi walls.

It appears that the occurrence of *S. kajkaiense* in northern Oman was not actually published until the appearance of Flora of the Arabian Peninsula and Socotra, Vol. 5, Part 1 (Cope 2007). In that volume, Cope rejects the earlier determinations of *S. spontaneum* from Oman and considers them to be in part *S. griffithii* and in part *S. kajkaiense*.

Cope plotted the Arabian distribution of *S. kajkaiense* on the basis of professionally determined specimens, which are limited to two sites in the Western Hajar Mountains of northern Oman and several along the coast of the Eastern Hajar, including the Sur area (Cope 2007, Map 421). Its habitat is described as "Wadis; 50-650m" and its known range outside Arabia is given as Iran, Afghanistan and Pakistan. However, this information remains to be widely disseminated locally and *S. kajkaiense* first came to the authors' attention in late 2008 through a communication from Cock, who wrote to request a review of the local geographical nomenclature used in a draft of Cock (2008/2009).

## Distribution

Armed with the information provided by Cock, the authors were able to distinguish *S. kajkaiense* and, in the course of investigations during the summer of 2009, to recognise it at a number of sites along Wadi Qahfi and also in many of the wadis along the west flank of the Western Hajar Mountains in northernmost Oman, from Wadi Jizzi in the south to the Hatta road in the north. Those areas remain relatively remote from Muscat but are well known to many UAE-based naturalists. It also proved to be a relatively straightforward matter to locate a few clumps of *S. kajkaiense*, but only a few, in Wadi Shawkah, UAE, some 30 km north of the Hatta road, a first record for the UAE.

*S. kajkaiense* was not found in all wadis, however, and in some wadis only a few specimens were observed. In terms of distribution it can be considered the wadi equivalent of a riparian species, localised in the "wettest" wadis, and almost always in or adjacent to the lowest

areas of the wadi bed (**Fig. 1**), where permanent water is nearest the surface and where the soil remains somewhat damp, even in summer. It can occupy slightly higher ground near seeps or where thicker accumulations of silt preserve moisture. Closely associated species include *S. ravennae*, the large rush *Juncus socotranus* and (in the relatively 'wet' wadis of the Mahdhah area of Oman, north of Wadi Jizzi) the smaller, rush-like sedge *Schoenus nigricans*. **Fig. 2** shows the observed distribution of *S. kajkaiense* in the UAE and neighbouring Oman.

*S. ravennae* is a wadi bed species like *S. kajkaiense* but it is evidently less dependent on regular access to near surface water. It is present in most gravel wadis in the Hajar Mountains and common in many. Compared to *S. kajkaiense*, it extends to higher ground at a greater distance from the axis of the watercourse, especially where silt has accumulated either in the wadi bed or in niches in the rocky wadi walls. *S. ravennae* is much more common overall than *S. kajkaiense*, but their relative abundance at any given site depends upon the amount of surface water present, and *S. kajkaiense* may be locally abundant, e.g., in parts of Wadi Musah (**Fig.3**).

To the south of the area of initial investigations, *S. kajkaiense* is almost certain to occur in the area immediately south of Wadi Jizzi, e.g. in Wadi Sarfanah and Wadi Daqiq, which have relatively abundant surface water. To what extent it can be found still further south, e.g. in Wadi Ajran, Wadi Qumayrah and beyond, remains to be investigated, but Cope's data suggest that it may prove to be present at least intermittently. The northernmost site plotted in Map 421 seems to be in the vicinity of Wadi Jizzi.

To the north, the search for *S. kajkaiense* at additional likely sites within the UAE has been unsuccessful. For example, the authors failed to find *S. kajkaiense* in areas of permanent surface water in mid-Wadi Asfani, just c.10 km north of Shawkah, where *Juncus socotranus* dominates the wadi bed assemblage, accompanied by *S. ravennae* and *Tamarix* sp. The result was the same for the relatively wet Yas Fork of Wadi Mowrid, east of Al-Ghail, some 35 km north of Shawkah, despite dutifully marching past perhaps a thousand clumps of *S. ravennae*; and for tributaries of Wadi al-Fay, on the southern edge of the Musandam region, a further 15 km to the north, where *S. ravennae*, *J. socotranus* and *Nerium oleander* are abundant in association with permanent surface water.

Likewise, although it seemed reasonable to expect *S. kajkaiense* in wadis in the Hatta area, several of which feature permanent water at travertine springs, investigation at several sites has failed to reveal it there, although *S. ravennae* can be abundant (**Fig. 4**).

On the East Coast of the UAE, permanent water is relatively scarce except in Wadi Wurayah, which features the UAE's only year-round waterfall. There a single *S. kajkaiense* plant was found within the forest of *Arundo donax* reeds and *S. ravennae* above the falls. A by-product of that particular visit was the discovery of the tall, reed-like sedge *Cladium mariscus*, apparently a first record for the UAE. Other potential East Coast sites in Wadi Safad and Wadi Hayl did not reveal *S. kajkaiense*. However, it is not unreasonable to expect it to occur to the south, in some of the larger, wetter wadis of the Batinah coast of Oman.



**Fig 1.** *Saccharum kajkaiense* along Wadi Khadra, showing its affinity for low ground.  
A clump of *S. ravennae* is visible at top, left of centre.

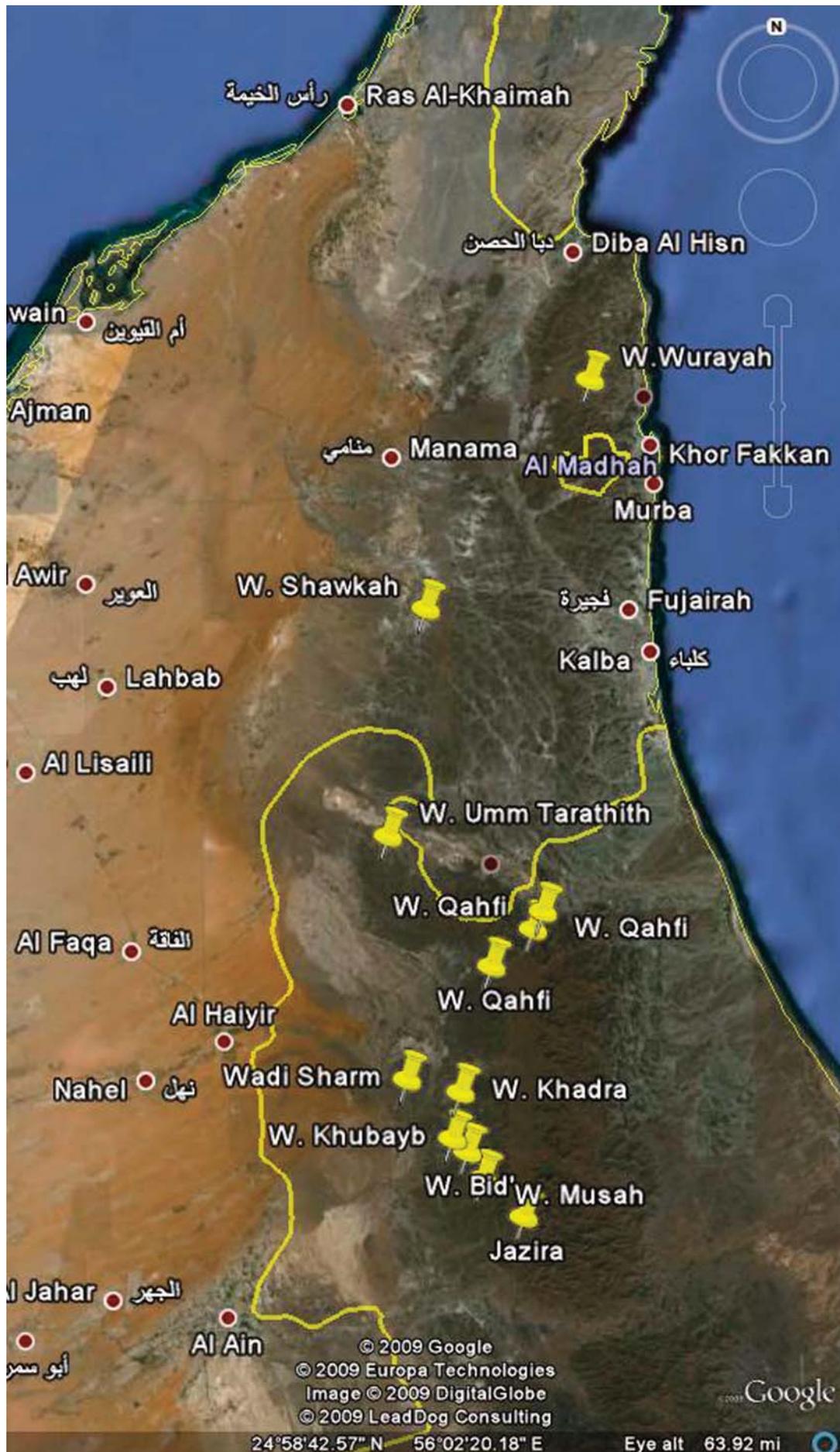


Fig 2. Observed distribution of *Saccharum kajkaiense* in the UAE and neighbouring Oman.



Fig 3. Abundant *Saccharum kajkaiense* (right) in Wadi Musah.

### Identification

Despite the gross similarity between clumps of the two *Saccharum* species (**Fig. 5**), the authors found that *S. kajkaiense* can be confidently distinguished from *S. ravennae* by a number of characteristics that are easy to observe in the field, even if the plants are not in flower:

- 1 **Size:** *S. ravennae* grows to be a much larger plant and is more robust overall, with heavier culms (stems) and peduncles (the spike of the inflorescence). *S. kajkaiense* does not exceed c.1.5 metres in height.
- 2 **Colour:** *S. ravennae* is relatively bright green and drying leaves become a contrasting, slightly orange colour. *S. kajkaiense* is paler, somewhat grayish-green, and dried leaves turn a pale straw colour (**Fig 6**).
- 3 **Leaf form:** *S. ravennae* leaves are normally flat (but may curl when dry or after collection). *S. kajkaiense* leaves are always rolled, usually to full a "U" shape or more.
- 4 **Leaf surface:** The underside (abaxial surface) of the leaves is smooth in *S. kajkaiense* (except sometimes distally) and normally slightly rough in *S. ravennae* (although many specimens in the Mahdhah area were also relatively smooth, except distally).
- 5 **Denticles on leaf margins:** *S. ravennae* leaves have a continuous whitish border of fine asymmetric teeth like the blade of a crosscut saw. The leaf margins of *S. kajkaiense* have intermittent single, slightly curved, whitish spines, sub-parallel to the leaf edge; these may be somewhat more closely spaced distally. The denticles can be seen with the naked eye under optimal conditions, but are best observed with a hand lens.
- 6 **Branching:** In *S. ravennae* the leaves separate at or very near the base of the plant. In *S. kajkaiense*, the lowest leaves separate c.20-30 cm above the ground.
- 7 **Ligule:** The ligule is the interior of the area where the leaf separates from the culm (stem). In *S. ravennae* the ligule is always somewhat hairy and normally has a distinct brush of soft, light brown hairs. The ligule is not hairy in *S. kajkaiense*.
- 8 **Base of stem:** The base of the culm (stem) is relatively thin in *S. kajkaiense* and has a round cross-section. In *S. ravennae* the base is thicker and is flattened into an elliptical cross-section; it may also be finely hairy.
- 9 **Palatability:** *S. ravennae* often shows evidence of browsing. *S. kajkaiense* does not.
- 10 **Inflorescence:** *S. ravennae* has a large, elliptical inflorescence, more than 20 cm long. The inflorescence in *S. kajkaiense* is smaller (20 cm or less) and narrower (more spike-like). The spikelets of both species are hirsute, but the hairs of *S. kajkaiense* spikelets are finer and are more clearly confined to discrete whorls emanating from the base of the spikelet.



Fig 4. A monospecific stand of small *Saccharum ravennae* in a wadi near Hatta.

Fig 5. Confusingly similar: The two grass clumps on the left of co-author Karki are *Saccharum kajkaiense*; the two on the right are *S. ravennae*.



Fig 6. A large stand of dry *S. kajkaiense*, a somewhat unusual sight.

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