Some remarks on *Arisaema flavum* and its subspecies

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Writing on *A. flavum* today, even a few lines, could be regarded as useless. Indeed, since Schott's time (19th century), this arisaema species seemed both well known and widely cultivated. However, some years ago two scientific papers [1] [2] were published which question the accepted views on this species. To understand the problem, let us follow a chronological path which, I feel, is important.

In 1775, the description of *Arum flavum* was published using specimens collected by P. Forskål a few years before (1763) in the mountains of the Arabic peninsula (today N. Yemen). About one century later, in 1857, Schott described *Arisaema abbreviatum*, a new species he collected in W. Himalaya, from the region of Simla. And three years later, in his classification of the new-born genus ARISAEMA Mart., he merges his *A. abbreviatum* with the "old" *Arum flavum* (on the basis of herbarium specimens): they now become *Arisaema flavum* (Forsk.) Schott. Why ? Maybe on the basis of some similarity between them, but this is not sufficient. Perhaps due to the peculiarity that both plants are known to always bear monoecious spadix, i.e. male and female flowers are simultaneously present. In this characteristic, *A. flavum* deeply differs from all other arisaemas and, as a result, Schott even created a new genus DOCHAFA in order to re-establish the monophyletic character of the genus ARISAEMA, Arisaemas indeed differ from all other aroids by their sex changes from year to year. It is amusing to remark, according to Forskål in his "Flora Ægyptiaco-Arabica sive descriptiones plantarum", that Dochaf is the word used by Natives to refer to *Arum flavum* Forsk. and *Arum pentaphyllum* Forsk. But the genus DOCHAFA had a short life, being merged in 1920 once more with ARISAEMA by Engler[3]. Later, in 1971, Hara reused the word DOCHAFA and gave this name to a section of genus ARISAEMA.

Recently a Japanese expedition (Tohoku University China Expedition, 1986) came back, from Tibet, with a collection of plants which were supposed to be *A. flavum*. However after examination, J. Murata discoverd that these specimens don't match Schott's description. In fact, some spadices have only male flowers. Of course the situation had to be reconsidered from the very beginning. And J. Murata, to which living material, from Yemen, was sent by Kew, soon discovered that the

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[1] Murata, J. (1990). Three subspecies of *Arisaema flavum* (Forsk.) Schott (Araceae), J. Jap. Bot. Tokyo 65(3): 65-73.

[2] Kao, P.C. (1989). Two New Species of *Arisaema* from Sichuan. Acta Botanica Yunnanica 11(3): 309-310.

[3] Engler, A. (1920). Das Pflanzenreich 73(IV, 23 F): 172. Wilhelm ngleman, Leipzig.

two suspects were indeed two of three different subspecies! Let us take them one by one and travel from West to East.

Arisaema flavum (Forsk.) Schott *subsp. flavum* from the mountains on both sides of the Strait of Bab-el-Mandeb (Ethiopia, Yemen). Alas, Forskål's description is so concise that it is hardly possible to get a good idea of his discovery. The specimens depicted in the Botanical Magazine[4] (in color), in Hooker's paper (1900), show a small inflorescence, quite dark inside and are said to have a "spathe short, green, or yellowish, purple within, streaked with green; [and a] tube globose striated and strellised". If, you also open Engler's PflanzenReich and look at the line drawings, you will see that the spathe-limb is indeed longitudinally dark striped inside and that no trace of a dark blotch appears at the throat (junction of the blade and the tube). Moreover, the area occupied by the female flowers is "three times less than the male flowers", Engler says.

Arisaema flavum (Forsk.) Schott *subsp. abbreviatum* (Schott) Murata from W. & C. Himalaya (Oman to Nepal). This is the usual plant encountered today in the trade: it is smaller than *subsp. flavum* and even dwarf forms can be found. The inflorescence, one of the smallest in the genus, appears slightly later than the leaves and remains at their level. The blade is yellow inside and outside, only faint white lines can be seen. A dark purple blotch conspicuously decorates the throat of the spathe where it often looks like a flying bird. In this subspecies, female flowers approximately balance male ones.

Arisaema flavum (Forsk.) Schott *subsp. tibeticum* J. Murata from E. Himalaya (Sichuan to Bhutan and Tibet). It was described by Murata in 1990. This subspecies is the tallest and has the largest inflorescence, much larger than those of its Himalayan relatives. Here, as in *A. nepenthoides*, the spathe appears before the leaves unfurl (see photo) and eventually exceeds their height. The bright large yellow spathe blade is erect and, inside, doesn't bear the conspicuous purple blotch at the throat. The upper part of the tube is hardly stained inside with only a few horizontal purple dots. Chris Chadwell recently sent me an illustration he found in a book edited by the Dharamsala Tibetan Institute showing that *subsp. tibeticum* is used in Tibetan medicine.

The three different spathes are illustrated in the following line drawings. The spathe representation of *A. flavum* (Forsk.) Schott *subsp. flavum* has been made according to Hooker's and Engler's figures.

It is very interesting to take a relief map and look at the distributions of these three subspecies. *Subsp. flavum* is well separated from its Himalayan relatives by the Desert of Dhana. It must be considered as evolving from an African distribution. Going to the East, one meets the Mountains of Oman facing the Hindu-Kouch which merges, in Afghanistan, with the Himalayan range. There

[4] Hooker, J.D. (1900). *Arisaema flavum*. Bot. Mag. 126: t. 7700.

is where the distribution of *subsp. abbreviatum* begins. Curiously, to our knowledge at least, the presence of *A. flavum* is not reported in E. Nepal and we personally didn't come across any specimens in either Sikkim or in the Darjeeling area. Going eastward again, one finds *subsp. tibeticum* from Chumbi and Bhutan to Tibet, on up to Sichuan.

All three of them are reported from well separated distributions, hence their subspecies status.
I think that this geobotanical aspect must not be under evaluated.

At the beginning of this write-up, I pointed out that two papers were recently published on the subject. Indeed, Murata's paper was just completed when a new species from Sichuan, *A. daochengense*, was described by P.C. Kao, the Chinese botanist who edited the chapter on Araceae in Flora Sichuanica. Obviously *A. daochengense* and *A. flavum subsp. tibeticum* could well be identical as they have the same morphology. One very important difference however, Kao speaks of unisexual spadices, i.e. male or female. On the contrary, *subsp. tibeticum*'s are male or bisexual, female-only spadices don't occur. Unfortunately, the line drawings included in the original description of *A. daochengense* only depict a male spadix and no female one.

We could not exclude the possibility of a mistake in the original Latin description of *A. daochengense*, due to an error in the translation of the Chinese text. If male and bisexual appendages do actually occur, this last species would indeed be synonymous to Murata's *subsp. tibeticum*. To explore this possibility, the Chinese text was translated with the help of a Chinese friend of mine. We found that both texts, in Chinese and in Latin, fully agree. *A. daochengense* is explicitly said to "differ from [the previously known *subsp. flavum* and *subsp. abbreviatum* of] *A. flavum* by the presence of an unisexual spadix". If specimens square with this scientific description, we must admit that a fourth DOCHAFA has indeed been found in China (Sichuan). We just have to wait until it will be available in the trade to enjoy this recent discovery.

Anyway, the adult specimen illustrated in this paper, is bisexual and perfectly matches Murata's description of *A. flavum subsp. tibeticum*. Let us just point out, before closing this study, that the inflorescence of this last subspecies has an agreeable odour, a rare and distinctive feature it shares with two other Chinese species *A. candidissimum* W.W. Smith and *A. odoratum* J. Murata & S.K. Wu.