
The Flowering of Cultivated Bamboos

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Source: *Bulletin of Miscellaneous Information (Royal Botanic Gardens, Kew)*, Vol. 1907, No. 6 (1907), pp. 228-233

Published by: Springer on behalf of Royal Botanic Gardens, Kew

Stable URL: <https://www.jstor.org/stable/4111870>

Accessed: 17-03-2022 16:24 UTC

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when lifted off. It is sufficient to renew the empty paper between these sheets from time to time. How often this has to be done depends mainly on the moisture of the air, if not done over fire. On the whole, grasses dry quickly and without changing colour. They may from the beginning be subjected to considerable pressure.

5. Every specimen should be accompanied by a numbered label, the numbers running on through the consecutive collections. The label should contain the name of the collector, the name and general character (wood, bush, savanna, river banks &c.) of the locality, approximate altitude, date of collecting, average height, frequency, association, or any other peculiarity of the grass which can only be made out in the field.

6. If in unexplored countries there is not sufficient time for thorough collecting, attention should be paid in the first place to the grasses which are most striking on account of their frequency, their general appearance, or their economic importance. It is better to have them well represented than to have an indiscriminate set of scraps.

7. In fairly well explored districts, the commoner and most conspicuous grasses might be treated more superficially, although they should by no means be neglected, and an eye might be kept on them with respect to their variation and physiological and economic peculiarities (*see* p. 208). On the other hand, small or rare grasses or such as flower irregularly or in unusual seasons should be the principal object of the collector. The collector should, however, always keep in mind that many grasses require close comparison to distinguish them, and that it will therefore be safer for him to err on the side of duplicating his specimens than otherwise.

The opportunities of the collector, particularly the traveller who has in the first place other objects to pursue, will of course not always permit him to carry out to the full the recommendations laid down here; but the minimum to be insisted upon is the collecting of identifiable specimens (paragraphs 1 and 2) and proper localising. Without that his time will frequently be wasted.

XXXVI.—THE FLOWERING OF CULTIVATED BAMBOOS.

W. J. BEAN.

The last two decades have witnessed a great increase in the popularity of hardy bamboos. It was not, indeed, until about 1891 that any general interest was taken in them by horticulturists in this country, although their merits had been appreciated by French cultivators for some years previously. The formation of the Bamboo Garden at Kew in the winter of 1891–2 not only marked the beginning of a more general cultivation of these plants in Britain, it helped largely to bring it about. It was the first, and still remains the most important, collection open to public

inspection. The publication by Mr. A. B. Freeman-Mitford (now Lord Redesdale) of his most useful and able work "The Bamboo Garden"* has also been the means of greatly popularising these plants in gardens, and diffusing a general knowledge of their characteristics and requirements.

But during the past few years the enthusiasm of cultivators of bamboos has had a serious setback. They have been concerned to see the flowering of their bamboos one after another, followed, as that phenomenon nearly always is, by the death or serious crippling and disfigurement of the plants. Only those who have witnessed it can appreciate the grievous transformation that takes place when a bamboo, hitherto embodying the very perfection of leafy grace and vegetative vigour, breaks into flower and, in a few months, becomes a bundle of dead, leafless sticks.

The reports of botanists and travellers, especially in the Eastern tropics, had acquainted us with the phenomena attending the flowering of bamboos in their natural state: the transformation of great areas of luxuriant bamboo forest into barren, and often (by the firing of the dead stems and leaves) blackened deserts. Under cultivation in Europe, too, bamboos had been known to flower at rare intervals. The well-known *Arundinaria japonica* (Bambusa Metaké), for instance, flowered in 1872 and 1874, and *Arundinaria Falconeri* flowered in 1876; in the latter case the flowering was followed by the death of all the plants. But the likelihood that the new hardy bamboos introduced so freely into cultivation 15 to 20 years ago would flower in their due time did not enter many people's minds. The event was too uncertain and too few people had seen the results for them to be disturbed by any thought of the fate that would overtake their bamboos when the time for flowering had come.

The experiences of the last few years have considerably increased our knowledge of the behaviour of bamboos flowering under cultivation, and it seems desirable that some record should be made embodying our knowledge so far as it goes. The species enumerated in the following notes are all, so far as we know, that have flowered under cultivation within the last thirty years. The list will enable future cultivators to form some estimate of the probable duration of the lives of their plants and to judge of their value too. For it seems that we shall have to regard bamboos in much the same light as leasehold property. Other things being equal, a plant recently raised from seed, with pretty nearly its full term of years to run, will obviously be of more value than another with the greater portion of its "lease" expired.

Arundinaria auricoma, Mitford.—Flowers were noticed on plants growing in the Bamboo Garden at Kew as long ago as 1898, and they have been seen every year since. It is only very few of the culms, however, that flower, and except that the flowering culms die, the plants are not affected.

A. falcata, Nees.—Flowered in the Temperate House at Kew in 1884 and about the same time in several other places. It had flowered previously in Europe during the years 1866–7.

* London: Macmillan & Co., 1896.

A. falcata, var. *glomerata*.—This also grows in the Temperate House and flowers almost every year on a certain number of culms, but the plant as a whole does not suffer. According to Gamble this sporadic flowering is characteristic of the type in a wild state.

A. Falconeri, Gamble (*A. nobilis*, *Mitford*).—The first introduction of this species to Britain took place apparently in 1847. A quantity of seeds were sent that year to Kew from India by Mr. Madden, and from these no doubt most or all of the plants in Irish and Cornish gardens were derived. In the same year seeds were obtained by Van Houtte, and in 1848 young plants were offered for sale by him. Nearly all these plants flowered simultaneously in 1876 by which time the species was cultivated in most European countries and in the United States. The plants died but produced seeds freely and from them the present generation of plants was raised.

The flowering of *Arundinaria Falconeri*, however, like that of many other Bamboos, is not simultaneous in the sense that plants in various places, or even in the same place, flower during one summer. Lieut.-Colonel Prain has noted the same thing in the Bamboo forests of the East. Although the general flowering of a species may occur in one particular year, it is heralded by the flowering of a few forerunners the previous year and followed by that of laggards the next. The year 1876 was the great flowering year of *Arundinaria Falconeri* and our specimens show that plants flowered then at Kew, Mount Edgumbe, and wild in Sikkim. But plants had flowered at Trentham in 1875, whilst others at Holland House did not flower until 1877.

We seem at the present time to be in the midst of another but more protracted flowering period. As long ago as March, 1903, Kew received flowering specimens from Mr. J. C. Hawkshaw's garden at Hollycombe, Liphook; in 1904 they were received from the late Hon. Charles Ellis of Frensham Hall, and in 1906 from Lord Lansdowne's garden at Derreen, Kenmare; but none of the plants at Kew have yet flowered generally.

It should be noted that *A. Falconeri* does not always flower over the entire plant at one time. Odd culms flowered at Kew during 1893 and 1894.

A. Hookeriana, Munro.—Flowered in the Temperate House at Kew in 1899 and bore seed. All the Kew plants died, but at Glasnevin, where it flowered at the same time, some died whilst others recovered.

A. intermedia, Munro.—Flowered in the Temperate House at the same time as the preceding, and died also.

A. japonica, Sieb. et Zucc. (*Bambusa Metaké*, *Sieb.*).—In Lady Dorothy Nevill's garden at Dangstein this well-known Bamboo flowered in 1874. The late Signor Fenzi also records its flowering at Florence in 1872 (*Gard. Chron.*, 1872, p. 1228). Specimens in the Kew Herbarium show that it was flowering in Japan in 1877.

A. racemosa, Munro.—Flowered in the Temperate House at Kew in 1899.

A. Simoni, A. & C. Rivière.—As long ago as 1892, the first year of the Bamboo Garden at Kew, we noticed odd culms flowering on the plants of this species growing there. But excepting that the flowering culms died, the plants were in no way affected. Their general vigour and the number of young culms sent up were in no way diminished. They continued to flower in this way every year up to 1903, by which time we had almost come to regard *A. Simoni* as a perennial. In that year, however, the plants in the Temperate House flowered on every culm, and, after producing an abundance of seed, died. This species is, of course, quite hardy, and large clumps 18 feet high were growing at that time in the Bamboo Garden, but it was not until the two following years (1904–5) that these flowered on every culm. After that not a single trace of leaf-growth was ever visible and the plants were ultimately uprooted.

A. Simoni var. *variegata*, Hook. f.—This differs from typical *A. Simoni* only in having a proportion of its leaves striated with white. Often, so few leaves are marked, that the plants scarcely differ from ordinary *A. Simoni*. Yet, curiously enough, although every particle of the true *A. Simoni* has flowered, not one of the specimens of this variety has done so. It is figured in Bot. Mag. t. 7146 where it is said to have flowered in 1877, but whether the flowering was partial or complete cannot be inferred from the context. [Since the above was written I have seen a plant of this variety flowering in Messrs. Veitch's nursery at Coombe Wood. We may infer therefrom that the plants of *A. Simoni* var. *variegata* in this country are about to share the fate of the type. —W. J. B.]

A. Simoni var. *Chino*, Makino (*A. Laydekeri*, Hook. f.).—This is a dwarf Bamboo with mottled leaves, very distinct from the type. It flowered in the Bamboo Garden at Kew in 1896 all over the plant, and although every effort was made to save it (as it was the only one we had) it died the following year. According to a letter from Mr. A. B. Freeman-Mitford (now Lord Redesdale) dated Nov. 17, 1901, this Bamboo had flowered at Batsford during the four previous seasons and was none the worse. But this, I assume, was the partial flowering which has been alluded to as characteristic of *A. Simoni*.

Chusquea abietifolia, Griseb.—A striking example of simultaneous flowering is afforded by this West Indian Bamboo. Sir Daniel Morris records the phenomenon as seen by him in 1884–5, in Gard. Chron., Oct. 23, 1886, p. 524, where he observes that “when the seed was set, the stem began to die down and apparently every plant in the island [Jamaica] died, root and all.” It is a curious fact that a plant growing in the Palm House at Kew flowered at exactly the same time and died also.

Phyllostachys aurea, A. & C. Rivière.—Flowered with Signor Fenzi at Florence in 1876, but so far as the British Isles are concerned we have but one record of its flowering. This was in Mr. S. T. Heard's garden at Rossdohan, Kerry, in 1905.

P. nigra, Munro.—Several reputed species of *Phyllostachys* have, as a consequence of their recent flowering, had to be reduced

to varieties of *P. nigra*. However much they may have differed from each other in leaf and stem characters, the bamboos here grouped under *P. nigra* have shown not the least difference in floral characters. In this respect they are absolutely identical with *P. nigra*. At Kew *P. nigra* itself has not yet flowered, although all the varieties here mentioned have done so. It has, however, flowered in other places. In 1900, it flowered with Mr. F. W. Moore at Glasnevin, Dublin; in 1901, with the late Hon. Charles Ellis at Frensham Hall near Haslemere; and, in 1902, with Lord Ventry at Burnham, co. Kerry.

P. nigra var. *Boryana* (*P. Boryana*, *Mitford*).—Flowered at Kew in 1904, and at Exeter the previous year. Of the original plant at Kew a small portion is still alive; this may be from a piece of rhizome which had not flowered. At any rate the entire plant died with this exception.

P. nigra var. *Castillonis* (*P. Castillonis*, *Mitford*).—This beautiful bamboo, with its golden-yellow stems, is very different from the ordinary black-stemmed *P. nigra*. Yet when it flowered at Kew, in 1903 and 1904, it was found to be the same species.

P. nigra var. *fulva*, (*P. fulva*, *Mitford*).—Flowered at Kew in 1905.

P. nigra var. *Henonis*† (*P. Henonis*, *Mitford*).—Flowered at Tilgate, Crawley, Sussex in 1898; at Menabilly in Cornwall, Regent's Park, and Rodway House near Bristol, in 1900; and since then in very many gardens. At Kew it flowered in the Temperate House in 1902; and in the open air from 1903 to 1905. None of the plants recovered and the collection has sustained no severer loss than that of this beautiful bamboo.

P. nigra var. *punctata*.—First flowered at Kew and at Abbotsbury in 1900. During the next few years other plants flowered at Kew and in numerous other gardens.

The following cultivated species have not yet flowered in this country, but it may be of interest to give the dates when they were last known to flower in a wild state.

Arundinaria aristata, Gamble.—Now cultivated in the Temperate House at Kew and by Mr. S. T. Heard at Rossdohan, Kerry. It flowered in Sikkim in 1895.

A. macrosperma, Michx.—This is the only hardy bamboo from the New World. It flowered in the S. United States between 1872 and 1878.

A. nitida, *Mitford*.—Mr. E. H. Wilson collected flowering specimens of a bamboo in Western Hupeh, China, June, 1900, which were subsequently identified as this species.

Some bamboos evidently go much longer than others without flowering. *Bambusa tessellata*, Munro, has been in cultivation for probably over sixty years, yet I have seen no record of its having flowered anywhere. It is the same with *Arundinaria Fortunei*, A. & C. Rivière, which has been in cultivation for nearly, or quite, fifty years.

There is, no doubt, a good deal yet to be learnt about the flowering of bamboos. We know, however, that they have two

methods of flowering—the partial or sporadic as contrasted with the complete and simultaneous. The partial flowering, as in the case of *Arundinaria Simoni*, is sometimes merely the beginning of the end, and culminates in the flowering of the entire plant and its death. Whether there are species that will continue to flower at intervals and never break into that general flowering which is always followed by the death of the individual plant, we do not yet know. But from what is noted above with regard to cultivated species, it would appear that the production of flowers is fatal to that part of the plant affected. If the whole plant flowers then the whole of it dies. Every one of the *Phyllostachys* that has flowered hitherto at Kew has sooner or later died, with the exception of the small portion of a plant of *P. nigra* var. *Boryana* noted. Seedlings have been raised from most of them, but as the parent plants have all proved to be varieties or forms of *P. nigra*, it is doubtful whether their progeny will reproduce their peculiar characters.

Mr. E. H. Wilson, the well-known collector of Chinese plants saw *Phyllostachys nigra* in flower in the Yang-tsze valley in May, 1903, and he says "I noted that only the flowering culms die" (Gard. Chron. Aug. 12, 1905, p. 125). It would be interesting to know whether the length of life in a bamboo would be altered by deferring the sowing of the seed. Judging by one's ordinary experience it would not; one would expect plants from the seed of *Arundinaria Falconeri*, sown in 1876, to reach the flowering state, other circumstances being equal, two years earlier than plants raised from similar seed kept until 1878. Yet when we consider the various accidents which even in a wild state would help to vary the time of germination, it would seem that some general law governs the flowering of many bamboos and keeps it practically simultaneous.

Under cultivation, on the other hand, the system of simultaneous flowering of some of these species would appear to be breaking down. For instance, *Arundinaria Falconeri* in this country, so far as our records show, first flowered between 1875 and 1877; in the vast majority of cases in 1876. But the flowering of the present generation has already extended over five seasons.

XXXVII.—ACCESSION OF TROPICAL AFRICAN PLANTS FROM 1899-1906.

OTTO STAFF.

The accession of tropical African plants to the herbarium during the last seven years has been particularly heavy, and as more than two-thirds were unnamed it was quite impossible to deal with them as they arrived. To avoid duplication of work only those collections which for special reasons had to be dealt with immediately were worked out separately, the bulk of them being pooled and treated as a whole. This involved a considerable but unavoidable delay in completing the determination of the earlier collections. By February last, however, all the tropical African