

## My Experiences with *Arisaema*

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I have known and admired arisaemas for most of the twenty or so years I have been interested in gardening and working in horticulture, but I have only seriously been trying to cultivate them and build up a collection over the last four years.

*Arisaema* is a genus of about 150 species of tuberous rooted perennials of quite diverse form and wide distribution. The majority of the species are from Japan, China and the Himalayas with others from southeast Asia, east Africa and North America. Most species that I have tried have a sub-spherical tuber which is replaced by the end of each growing cycle, leaving the papery remains of the old tuber below the new. *Arisaema speciosum* (Wall.) Mart. However, retains its old tubers for a number of years and, although young plants have the typical corm-shaped tubers, within a few years a rhizome-shaped tuber is built up. A few species including *A. concinnum* Schott produce thick radiating stolons with bulbous ends which spread several inches from the plant. In subsequent years they develop into normal shaped tubers.

The foliage varies widely and in the adult plants is compound, whereas with seedlings it may be simple or compound. Adult leaves may be trifoliate leaves while another radiate species, *A. consanguineum* Schott, which I have also germinated has a simple leaf. From one to three leaves, may be produced depending on the species, but, at least under British conditions, there is only one short flush of growth to the final height and number of leaves for that season, rather than a succession of leaves as occurs in some other tuberous aroid genera. The petioles and flower stems of some are very attractively streaked and spotted, greatly adding to their attraction. This is particularly true of *A. nepenthoides* (Wall.) Mart.

In theory it is likely that quite a large number of species would be hardy in the southeast of England where I garden. My half acre plot is a gentle north facing slope and the soil is a good, if a little heavy, loam over a clay subsoil. I am relating the various environmental details as my story is not by any means one of 100% success. So far I have discovered one overwhelming fact, that arisaemas are rather unpredictable and that I am quite a way from knowing many of the reasons for their erratic behavior.

In Britain (and probably world wide) the '*Arisaema* Enthusiasts Club' is a very select group consisting of only a few dozen people, (including botanic gardens,) who grow more than a few species each. However it would appear that once bitten with the interest it is possible to go a little crazy and become enthusiastic to the point of obsession. I believe that there are a number of reasons for the general rarity of the genus in cultivation. Probably the most significant is extreme unavailability. To my knowledge in Britain there are only four nurseries offering more than three or four species. The prices are rather high in comparison with many other bulbs at about £1.50-£12.50 each (\$2-\$15). A large number of other nurseries stock one or two species; the most commonly listed are the Chinese *A. candidissimum* W. Smith and the North American *A. triphyllum* (L.) Schott.

I have a very keen friend who grows his arisaemas almost entirely in pots of a peat based compost under glass, and it would appear that with a good deal of care this is probably the 'safest' method. I think he considers me a little reckless as, at least for the summer, I grow mine in beds in the garden. My garden is quite sheltered with a light canopy of medium sized trees especially around the

perimeter plus dense shrub plantings, and it is possible to find spots with many variations of shade at different times of the day and degrees of natural moisture. I have had my best successes by creating slightly raised beds by incorporating about six inches of sphagnum peat and three inches of sharp sand with the top nine inches of soil. I also put an inch of sand under each tuber when planting as is frequently recommended for lilies. The great advantage of growing in beds as opposed to pots is the greater increase in the size of individual tubers and therefore the size of the visible portion of the plant. I say individual tuber as I believe offsetting may be more prolific with plants grown in pots. I have three *A. consanguineum* which last winter had tubers that had reached ounces in weight each and this year produced plants 50 inches high which have as yet produced no offsets. My friend has much smaller plants of the same species freely offsetting in pots, but it is possible the difference between our plants may be due to clonal variation.

My failures have mainly been associated with starting the tubers into growth in the spring after they have apparently over-wintered. This spring I had several produce a shoot which actually broke the soil surface and then seemed to 'stick' for a couple of weeks. On carefully excavating away the soil around the shoots to see if there was a problem, I found a rot had set in near the base of the stem which was starting to attack the tuber. I was unable to stop the rot with several plants and they were lost. An accepted method of 'stopping the rot' that seems to work if it is not too advanced, is to scoop or cut out the infected portion of the tuber and to paint the cut surface with surgical quality methylated spirits and to leave the tuber in the air for a day or two to callus over. The failures seem to be quite random. Two out of three plants of the same species 9 inches or so apart in a bed may perform OK but the third behave as above.

One fact I think I have proved is that the longer the aerial portion of the plant can be kept on the *Arisaema*, the greater the increase in the size of the tuber, or in the case of seedlings the better the chance of forming a tuber at all. A few years ago I read an article in a professional horticultural journal on daffodils to the effect that if the foliage is encouraged to stay green and healthy for longer than normal the flowering potential is greater. It was discovered that applications of the fungicide, Benomyl just before the foliage starts to wither delays the death of the leaves for several weeks. I admit to not having a controlled experiment but I believe that for the last two seasons, in which I have been spraying my arisaemas with Benomyl, the plants have remained above ground longer. This may be due to preventing rotting in the case of my arisaemas, as they are growing in fairly shaded places. A dead flower from a tree or shrub can fall on a leaf, lie in a film of moisture and begin to rot the *Arisaema* leaf.

I have found keeping the foliage on the seedlings for as long as possible to be extremely significant, and many of my earlier attempts from seed were dismal failures. I know of several people who have various species seeding themselves around in the garden, but my own feeble successes have been with a far less natural method which I cannot claim to have devised myself. I try to resist any desire to sow the seed before its normal season for that species to grow naturally. I then clean the seed by soaking off any succulent remnants of the fruit, changing the water repeatedly until clean. Then the seed is soaked for 24 hours in clean water, after which it is drained and mixed with moistened vermiculite in a Petrie dish or some other container with a tight fitting lid such as a sandwich box and placed in a warm propagator or other place at a temperature of 75-80 degree F. After ten days or so the seed may be showing signs of producing a radicle. At this stage the sprouting seed is sown about 3/4 inch apart in pots or trays of a peat and vermiculite compost and covered with a sheet of glass to continue germination. As sowing has been delayed until the natural season cool, greenhouse conditions should be adequate for the seedlings. I had good success this spring with sowing the chitting seeds into a perforated water lily basket and immediately planting this up to its rim in the ground and covering with a sheet of glass as before. As the seed wasn't sown until late

May there was little risk of chilling the seedlings. At the time of writing, these little plants have had their first leaf for over three months, and I am optimistic that little tubers will have formed. I will lift the whole basket in late October and store in a frost free place for the winter.

Obtaining seed from arisaemas is by no means entirely predictable in cultivation either. Most species produce an inflorescence with only male or female flowers, so that two plants of opposite sexes are obviously required to flower at the same time in order to obtain seed. Individual tubers do not necessarily flower with the same sexed flowers each year. Generally the smaller tubers flower with male flowers on the spadix while more mature ones produce females. However, I had plants which have flowered female on year revert to male, presumably due to a lowering in nutritional status having set seed in the previous year. The above sex-changing phenomenon is botanically termed paradioecious. There are two species that I know that are monoecious. These are *A. flavum* (Forsk.) Shott and *A. tortuosum* (Wall.) Shott. The male flowers are carried above the female on the spadices of the monoecious species.

Pollination agents don't appear to be well documented but many species have greatly developed sterile appendices above the fertile portion of the flower spike. This may act as a scent attractant organ or a landing strip or ladder form the ground for the various insects.

Unlike some aroids pollinated by flies, the arisaemas I have flowered, (about twenty different species,) have no strong unpleasant odours. In fact most have no appreciable scent to my somewhat insensitive olfactory organs. My *A. tortuosum*, however, has a 'mushroomy' smell which while not unpleasant outdoors is somewhat overpowering in a room. My colleagues in the office where I work requested in quite forceful terms that I remove a potted specimen the first morning it opened, but I was sitting even closer and was in full agreement. The species being so diverse in design and distribution probably have equally diverse polling agencies, many of which will not be present in Great Britain. With nearly twenty flowers of *A. Candidissimum* of both sexes my plants don't appear to have set any seed this summer, whereas a single female flower was successfully fertilized by its own male offset, by removing the male spadix as the anthers were dehiscing and placing it in the female flower for few days.

My collection of just over twenty species has been designated a National Reference Collection by the National Council for the Conservation of Plants and Gardens, a recently formed society with the aims of its title. I am always interested to hear from other Arisaema growers of their cultural techniques and to learn of new sources of supply.

Fig 1. *Arisaema sikokianum* Fr. X Sav. X *peninsulae* Nakai.

Fig 2. *A. nepenthoides* (Wall.) Mart.

Fig 3. *A. concinnum* Schott. Single radiate leaf. Distribution: Himalaya, South Tibet, North Burma.

Fig 4. *A. negishii* Makino.

Fig. 5. *A. constatum* (Wall.) Martins. Solitary trifoliate leaf, parallel venation. Distribution: Nepal.

Fig 6. *A. exappendiculatum*. Ha?? Solitary radiate leaf, spathe doesn't open. Distribution: Himalaya.

Fig 7. *A. consanguineum* Schott with Alexandra Hammond.

Fig 8. *A. Sikokianum* Fr. and Sav. Distribution: Japan.

Fig. 9 *A. griffithii* Schott. One or two trifoliate leaves. Distribution: Eastern Himalaya.