



Agave montana at an altitude of 3,000m in the pine forests of northeast Mexico. The leaf rosettes flush red as they prepare to flower and die

Searching for hardy *Agave*

EXOTIC OR SUBTROPICAL gardening style is currently enjoying something of a renaissance. Certainly, with climate-change models predicting milder winters and hotter summers this previously marginalised aspect of gardening has suddenly grown up and become appropriately respectable.

But scientists warn us that rainfall patterns are set to change with little falling during the very period our gardens need it the most. Hosepipe restrictions become a real possibility;

Informed by three visits to the mountain woodlands of Mexico and cultivation experience in eastern England,
PAUL SPRACKLIN
reports on agaves with hardiness potential

maybe the rule, not the exception. So, what then of our tree ferns and bananas?

Confronting drought

Necessity has already forced me to confront this problem. A devotee of this style of gardening for over 20 years, I was first seduced, like many initiates, by large jungly leaves. I live in coastal Essex where, in an average year, we can expect just 50cm of rainfall. Big leaves equals big water bills, not to mention the time and

effort involved in supplying it to the plants. I started seeking out plants that are suited to arid growing conditions yet fulfil my need to grow dramatic plants. And I found succulents. Imposing succulents that, grown together, still paint an exotic picture yet outlive any hose ban. Succulents such as yuccas, dasylirions, nolinas.... and agaves.

Familiar species

So far, so good. But ask succulent plant collectors which agaves are most suited to growing outside and, in reply, you are most likely hear 'That's easy. None'. What little precedent exists for growing agaves outdoors is mainly found in the milder areas of southwest England. Wander around some of the Cornish seaside towns and you will see the familiar *Agave americana* often bursting its way out of a fisherman's tiny front garden like a cuckoo in a wren's nest.

Look more closely and some of those greener *A. americana* are actually *A. salmiana* – the sinuous flex of the leaf tip, the satin sheen of the leaves, and the slightly purple tones on the leaf margins help distinguish it. Some – the fatter, wider-leaved plants – are *A. salmiana* var. *ferox* (syn. *A. ferox*). This variety could be seen flowering on the Falmouth seafront, Cornwall, in 2007.

And just about the only other one seen outside enthusiasts' gardens is *A. mitis*, a modestly-sized, pale green plant with very small marginal teeth and a 'foxtail' style inflorescence, rather than the usual 'christmas tree'.

These agaves have one thing in common – they are fairly moisture tolerant and, although not the hardiest of the group, are among the most suited to growing in the wetter, milder regions. But here I am over the other side of the country – colder and drier. What plants can we grow

here, or, indeed, in other areas of England? A little research soon throws up some interesting data. Plants from the central US deserts in particular show immense cold tolerance: figures



Agave montana encounters cool summers and frost and snow in its temperate native habitat. In cultivation in the UK it has withstood -10°C

of -30°C are quoted for species such as *A. utahensis*. Easily hardy enough for my occasional -10°C winters, you would think. Sadly, the situation is not that straightforward. Although hardy to extreme cold, *A. utahensis* is very tricky to please outside as it is prone to rotting during the winter.

Superficially, we seem to have a paradox: moisture-tolerant agaves are hardy only in the mildest gardens, and species hardy enough to grow through England are unable to cope with winter moisture levels. There must be some kind of middle ground, surely? There is, and it is at this point we head for the Mexican woods.

Mexican adventures

My reading directed me to Mexico, home of the *Agave*, and to my mentor in all things Mexican: the Texan plantsman Richard Travis, a man well travelled throughout northern

Mexico. I cobbled together the itinerary for a trip and in November 2004, together with friend and nurseryman Toby Shobbrook, headed for the mountains of northeast Mexico. The first, as it turned out, of three such trips.

A few kilometres southwest of Ciudad Victoria in the state of Tamaulipas, just off highway 101, is located the small town of La Peña, our rendezvous point with Richard and from where we took a good dirt road into the mountains. Rapidly swallowing altitude, we left behind the yuccas and dasylirions of the semi-desert plains to above 2,300m where the habitat changed fairly abruptly to a forest of pines, dwarf oaks and arbutus.

It was here that we encountered the first of two woodland *Agave* species. *Agave gentryi* is a variable species found throughout northeast Mexico, both in moist woodland, as here, or on arid exposed mountainsides. Typically it forms sparse rosettes, around 1m in diameter, of dark green, often triangular-shaped leaves, sometimes ferociously armed with large marginal teeth. Some have only small teeth, some are considerably larger, all are recognisably the same species. These plants are abundant to around 2,700m from where, suddenly, it is replaced by another agave.

And what an agave! Imagine a sempervivum 1.5m across and you begin to picture *Agave montana*. It has scores of leaves packed densely into a rosette almost full to bursting. Although frequently spilling out onto open, sunny hillsides and road cuttings, it is mainly found deep into the woods as understorey. And these woods are temperate: this mountain reaches 3,020m with these agaves only being found in the top 300m. It is cool in summer and cold in winter – reaching -10°C in most years,

often lower. *Agave montana* are on the moist side of the mountain and are routinely covered in mist, drizzly rain, frost and even snow. The oldest plants in these populations, probably 30–40 years old, show no sign of previous cold damage to their pristine rosettes.

Both species are now filtering into cultivation and represent, without doubt, the best agaves that can be grown in England, and elsewhere in the temperate world. Two year old seedlings of *A. montana* have just seen through a winter temperature of -10°C in middle England in 2006/7, so it looks very encouraging.

Species to grow outside

Trying new plants is nothing new to Cornish pioneers who have been gardening on the edge since it became a leisure pursuit. But others in less benign climates have recently joined in. For example, Bob Brown, at his nursery Cotswold Garden Flowers in Worcestershire, has a bed of succulent plants that is left completely to the elements. Nick Macer, of Pan Global Plants, has a display garden in his Gloucestershire nursery with many succulent plantings being trialled. There is also a growing array of enthusiasts from all over the land seeking something new, exciting and rewarding. Gradually, an idea of what species will grow here is emerging.

One thing that seems clear, though sadly unhelpful, is that hardiness for many species seems to be clonal. To say that *A. salmiana*, for example, is hardy would be somewhat misleading. Some plants of some forms of *A. salmiana* are incredibly hardy to cold and damp combined, but others disintegrate into a pile of mush with the first frost. Given its enormous range in the Mexico – it is cultivated throughout the central highlands – I suppose this should be expected.

These hardy clones are being



Agave gentryi occurs at a slightly lower altitude than *A. montana* but occupies a similar habitat

identified and propagated by one or two keen nurserymen but at the moment the situation is less than satisfactory. Nevertheless, here are my recommendations for trying outside, in order of suitability – particularly hardiness. I have ignored *A. americana* completely – for me there are far more interesting and more appropriate species to grow.

Agave montana

This species was discussed above but I feel it is impossible to overstate

how exciting this plant is – not only one of the most beautiful agaves but with huge garden potential. Large plants should prove hardy to maybe -15°C.

Agave gentryi

This species was also discussed above. In the USA a particularly fine clone, *A. gentryi* 'Jaws', has been tissue-cultured, and is available in the UK occasionally. The species and this cultivar should be hardy to -10°C, probably lower.



In the wild, *Agave mitis* favours rock faces where it roots into crevices that act as seepage lines

Agave mitis (syn. *A. celsii*)

Like most agaves, this is variable but always attractive. Typically in cultivation it has open, apple-green rosettes, to 60cm in diameter, formed of lightly-toothed, slightly incurving leaves. In the wild it is found plastered vertically onto rock faces following slight seepage lines and hence deals with moisture quite adequately. It is also often seen growing in shade though I would default to a sunnier spot when trying it outside in the UK. It is not hardy in colder regions but can survive down to -8°C.

There is a particularly choice variety, *A. mitis* var. *albidior* (syn. *A. celsii* var. *albicans*), that is almost chalky white, compared to the usual pale green. It is rarely seen in cultivation but commonly mislabelled – if you are unsure what plant you have, it is not var. *albidior*.

Agave salmiana

With the disclaimers relating to hardiness already discussed above, this species offers some of the best agaves to try outside. There are variants with long, narrow leaves that



Agave bracteosa rosettes are not monocarpic

I have seen named *A. mitriformis* (usually regarded as a synonym of *A. salmiana*) that are not very hardy. At the opposite end of the scale is a dwarf, chunky variant identified previously as *A. coarctata* (again, now a synonym of *A. salmiana*). The latter has grown in my garden in Essex, undamaged by cold, for eight years.

Intermediate between these two extremes is *A. salmiana* var. *ferox*. In horticulture, this name seems to be applied to any variant of *A. salmiana* with wide leaves and large teeth.



Variants of *Agave salmiana* in cultivation with broad leaves and large teeth are usually called var. *ferox*

However, variation in the species, throughout its range in the central Mexican highlands, appears to be continuous. The most impressive plants of var. *ferox* I have seen are in Falmouth, Cornwall, and on Tresco in the Abbey Gardens. The more tender clones of this species are hardy to -3°C but the tougher ones can cope with -15°C.

Agave bracteosa

This species is unusual as far as agaves go; Gentry (1982) even suggested it could be placed in a new genus (along with *A. elmetetiana*). It has thin, almost wiry leaves, unarmed on the margins or tip, and the upper surface is convex. The offsets are produced from axillary buds rather than from underground suckers and each rosette flowers repeatedly rather than monocarpically.

This species is very distinct, very attractive, and unexpectedly, quite hardy. I know someone growing this near the renowned frost hollow of Rickmansworth, London, where it has survived -8°C.

Agave parryi

This species is more widely available than most, and has four recognised varieties. *Agave parryi* var. *parryi* is possibly the best candidate for hardiness, surviving temperatures below -10°C, and it is moisture tolerant. It is the largest variety, making rosettes, over 1m across, of comparatively long, grey leaves armed with black teeth and a terminal spine.

Agave parryi var. *huachucensis* is a little smaller and more desirable with wider leaves that seem, somehow, perfectly in proportion. Smaller still, and with even wider, almost round leaves, is *A. parryi* var. *truncata*: arguably the most handsome and certainly the most sought after. Unfortunately, this latter variety is the least hardy, maybe only down ➤

to -6°C or so. All will sucker to form small colonies (or spare plants) in time and are worth trying.

Agave havardiana & A. neomexicana
Agave havardiana is difficult to distinguish from *A. parryi* var. *parryi* but is an equally good candidate for growing outside. The main differences are in floral characters. Distinguishing agaves in the vegetative state is difficult but the marginal leaf teeth of *A. havardiana* tend to be larger, darker and recurved.

Agave neomexicana is similar but with narrower, even more silvery leaves and often with dramatically enlarged marginal teeth. In UK conditions both should be hardy to below -10°C.

Agave lophantha, A. lechuguilla and A. xylonacantha

In the wild, *A. lophantha* represents a variable and widespread complex. In cultivation it is usually represented by plants with open rosettes, to 80cm across, of narrow mid to dark green leaves, mostly with a median stripe of pale green. These are edged with a horny brown margin that is, itself, interspersed with small teeth.

Agave lechuguilla is similar but with narrower leaves, less pronounced marginal teeth and a more untidy habit.

Agave xylonacantha, as grown in Europe, is also similar to *A. lophantha* but with ripsaw-like teeth – a mixture of large and small, pointing in two directions. Plants grown under this name in Europe, including the UK, do not match plants in the wild. Genuine *A. xylonacantha* is larger with more open rosettes that have less leaves, and are a dull olive green compared to the brighter green of cultivated material.

All three taxa in cultivation are quite hardy, to -10°C or lower.



Agave parryi var. *huachucensis* is favoured for its broad grey-green leaves and neat habit

Agave parrasana

This species is small and chunky, with rosettes to 80cm in diameter. The wide grey leaves, especially broad at the base, and the variable marginal teeth make it an attractive plant. I know of pristine plants grown in Surrey for 12 years, yet one of my own died in winter for no apparent reason. It is hardy to -8°C or lower.

Agave filifera

This species has a slightly different look to the more familiar agaves. It forms a dense rosette, to 70cm across, of flat, incurving triangular leaves, the margins of which sport curling white fibres and no teeth.

The leaf surface is often beautifully marked with white bud-printing marks. It is hardy to -8°C or lower.

Agave atrovirens* var. *mirabilis

The species is widely distributed in central Mexico but this variety, occurring at about 2,500m in the montane cloud forests of Veracruz, is one of the most dramatic and massive of all agaves. The rosettes can reach 2.5m high and 4m wide. It is not yet available commercially.

Agave ovatifolia

From further north, near Saltillo in Nuevo León, *Agave ovatifolia* is another large, beautiful, hardy and



Genuine *Agave xylonacantha* in the wild



Agave xylonacantha as grown in Europe



Greg Starr

The blue-grey leaves with large marginal spines make *Agave parrasana* a desirable species

damp-tolerant agave. This species was named in 2002, is already in tissue culture in the US, and is just becoming available in the UK. However, beware of nurseries offering plants with green leaves which may be incorrectly named; genuine material I have seen in the US has intensely silvery foliage, even on young plants.

Cultivation

The most important factor in successful cultivation of *Agave* outdoors is drainage. In the wild they get seasonal rainfall with very little in winter. The quicker you can speed the passage of water past the roots, the better.



Bud-printing marks are visible on *Agave filifera*

Neil Holmes

I grow mine in raised beds with the rootball sitting on a generous layer of rubble. I then backfill with loose rubble, filling the gaps with a 50:50 mixture of 20mm all-in ballast and 10mm pea shingle. I do not recommend any soil at all. If you live in a milder region you may get away with using a richer mix, but I find growing them hard is best. If the medium is too rich the roots will rot each winter forcing the plant, at best, to re-root each year or, at worst, to die.

Apart from that they are undemanding plants to grow. A position in full sun is most important, as is good air circulation. Some species, particularly those from higher rainfall regions, may actually benefit from a little extra water during spring and summer but most will get by without. Those that benefit include *A. atrovirens* var. *mirabilis*, *A. mitis* and *A. salmiana*, and probably *A. ovatifolia*, *A. montana* and some provenances of *A. gentryi*. An annual top-dressing of slow-release balanced fertiliser is all they need by way of food. Weeding presents the biggest challenge – in particular keep a look out for rhizomatous weeds in pots before planting out.

Propagation

Most *Agave* species can be propagated from the copious plantlets produced on underground runners. These should be detached, allowed to dry out for a few days, potted into gritty compost and then grown on.

A few species produce bulbils on their inflorescences – a ready and quick method of propagating.

All species can be raised easily from fresh seed. Indeed, some can only be grown from seed: *A. montana*, for example, does not usually produce suckers except to a limited extent after flowering.

Some taxa have been micropropagated, such as *A. gentryi* 'Jaws' and *A. ovatifolia*. Particularly good clones of other agaves, such as *A. atrovirens* var. *mirabilis*, should also be considered for this method.

Conclusion

Climate change will force us to adapt our gardening practices. Living with summer droughts is something many must learn to cope with. One way forward is to garden with succulents, a group containing some of the most dramatic and architectural plants that can be grown outside in the UK. Judicious choice of species ensures survival of our damp dark winters.

Agaves are an important part of the mix and, despite historical prejudices, it is apparent that many species thrive when liberated from their pots and exposed to the elements. Certainly, some of the most exciting introductions are still to come. ■

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REFERENCE

Gentry, HS (1982) *Agaves of Continental North America*. University of Arizona, Tucson