A New System of Plant Hardiness Ratings for the British Isles

Almost by definition, users of the ***RHS Plant Finder*** are likely to be seekers out of new and unusual plants and inevitably one of the prime considerations when deciding to buy an unfamiliar plant is its likelihood of survival in the purchaser's garden. The complex factors that contribute to a plant's survival are generally, but perhaps misleadingly, referred to as "hardiness". Misleading, because in most people's minds, at least in the UK and similar temperate climates, this means the ability of a plant to survive our winter; or even the early or late frosts that signal the beginning or the end of our summer. Misleading also, as nurseryman Bob Brown of Cotswold Garden Flowers has deftly explained, because a plant's survival and success depends upon many other factors: climatic, edaphic, cultural and genetic. (Brown, 2000; Gardiner, 2013).

Against such an unpromising background, it is perhaps not surprising that in the UK attempts to devise a system to codify plant hardiness have been limited and rather basic, such as the one developed by the RHS in the 1960s, with a simple scale of H1 to H4, where H1 signified plants suitable only for greenhouses and H4 for bone-hardy plants. In continental climates, where there is a clearer transition between winter and spring, there is much greater scope for a system based on minimum winter temperatures. Indeed, it was at the Arnold Arboretum, Harvard, (Massachusetts) in the continental climate of North Eastern USA, where the zone system was first developed and which, since the 1940s, has been expanded and refined by the United States Department of Agriculture (USDA). In its most recent edition (USDA, 2012) it now extends from Z1 (Arctic) to Z13 (more or less tropical), with an 'a' and a 'b' for each zone, defined by steps of 5°F (2·8°C). It is this system, with its beguiling simplicity and its appeal to the more competitive plantsmen, which has taken root in the minds of gardeners and nurserymen alike. So much so, that it has become widely followed outside the US, even in the UK, where its drawbacks are frequently evident.

It is interesting to note that the USDA system does not find much favour on the US Pacific coast. Here another system has been developed which is regularly updated in the *Sunset Western Garden Book* (Brenzel, 2012). Although it uses zones, mapped out in considerable detail, and the zone definitions contain an element of winter temperatures, that is not the sole criterion. The descriptions of the 24 zones for mainland United States also note summer temperatures, growing season and even give a nod to native vegetation. Suffice it to say, the "Sunset" zones bear little similarity to the USDA map. Other systems have been devised in other countries (Brady, 2008) but generally what they gain in accuracy and objectivity they lose in practicality for the general gardener.

While the simple system originally devised by the RHS had some benefits, the increasing sophistication of gardeners and the wider array of plants being introduced, as well as the obvious difference that what might be regarded as H4 in southern England may well be considered to be H3 or H2 in colder regions, has led to a widespread view that it was time to overhaul the system.

Therefore in 2011 the RHS assembled a group of leading horticultural authorities to advise it on a new hardiness rating system. The approach they have recommended, although anchored to a scale of minimum winter temperatures, takes into account differences in plant performance due to different locations and ways of growing the plants. For this reason the RHS H1 is for greenhouse cultivation (see Table p.9) and in the new ratings distinguishes the different levels of cultivation under glass. The new RHS ratings have the advantage of being founded on a measurable and objective scale (avoiding the subjectivity of the old system) while being given some flexibility derived from the description.

There is no direct correspondence between the "old" and the "new" ratings. All plants that have been granted the RHS Award of Garden Merit (AGM) have been reassessed for hardiness as part of the 2012 AGM Review. These changes are reflected in this edition (2013) of the ***RHS Plant Finder***.

Dr John David
RHS Acting Head of Science

References

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Gardiner, J. (2013). New RHS hardiness ratings. *The Garden* 138(2): 68-69.

USDA (2012). Plant Hardiness Zone Map. http://planthardiness.ars.usda.gov/PHZMWeb/ (Accessed 12 Feb. 2013)

RHS Plant Hardiness Ratings Table

Rating[1]	Temperature range[2] (°C)	Category	Definition	USDA zones
H1a	>15	Heated greenhouse – tropical	Under glass all year	13
H1b	10 to 15	Heated greenhouse – subtropical	Can be grown outside in the summer	12
H1c	5 to 10	Heated greenhouse – warm temperate	Can be grown outside in the summer. (Most bedding plants, tomatoes and cucumbers.)	11
H2	1 to 5	Tender – Cool or frost-free greenhouse	Tolerant of low temperatures, but not surviving being frozen. Except in frost-free inner-city areas or coastal extremities requires glasshouse conditions. (Most succulents, many subtropical plants, annual bedding plants, many spring-sown vegetables.)	10b
H3	–5 to 1	Half hardy – unheated greenhouse/mild winter	Hardy in coastal and relatively mild parts of the UK except in severe winters and at risk from sudden (early) frosts. May be hardy elsewhere with wall shelter or good microclimate. Likely to be damaged or killed in cold winters, particularly with no snow cover or if pot grown. Can often survive with some artificial protection in winter. (Many Mediterranean-climate plants, spring sown vegetables for later harvesting).	9b/10a
H4	–10 to –5	Hardy – average winter	Hardy through most of the UK apart from inland valleys, at altitude and central/northerly locations. May suffer foliage damage and stem dieback in harsh winters in cold gardens. Some normally hardy plants may not survive long wet winters in heavy or poorly drained soil. Plants in pots are more vulnerable to harsh winters, particularly evergreens and many bulbs. (Many herbaceous and woody plants, winter brassicas, leeks.)	8b/9a
H5	–15 to –10	Hardy – cold winter	Hardy in most places throughout the UK even in severe winters. May not withstand open/exposed sites or central/northern locations. Many evergreens will suffer foliage damage, and plants in pots will be at increased risk. (Many herbaceous and woody plants, some brassicas, leeks.)	7b/8a
H6	–20 to –15	Hardy – very cold winter	Hardy in all of UK and northern Europe. Many plants grown in containers will be damaged unless given protection. (Herbaceous and woody plants from continental climates.)	6b/7a
H7	<–20	Very hardy	Hardy in the severest European continental climates including exposed upland locations in the UK. (Herbaceous and woody plants from continental climates.)	1–6a

[1] New hardiness ratings supersede the previous RHS hardiness ratings (H1-H4) which are not the direct equivalents of the new ratings.

[2] The temperature ranges are intended to be absolute minimum winter temperatures (°C), not the long-term average annual extreme minimum temperature used for the USDA zones.