Optimal pH requirements for different species

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pH requirements for different species vary widely. The basis for pH preferences varies. However, for many species, optimal medium pH levels vary because species differ in how well they can take up specific nutrients. Medium pH dramatically effects nutrient availability to a plant (Figure 1). As a result, as pH increases or decreases, some of the differences between nutrient uptake among species becomes obvious. These differences can occur because species have difficulty taking up nutrients such as iron or because some species take up too much of specific nutrients such as iron or manganese. In contrast, optimal recommended pH levels may not be related to nutrient availability at all, but rather susceptibility to disease.

As mentioned above, recommended pH levels may be related to the ability or inability of a plant species to take up a specific nutrient. For instance, many of us observed for years that as pH increases, petunias will express iron deficiency first among bedding plant species. Why?, because petunias have a hard time taking up iron. As pH increases and iron becomes less available in the media, petunias will show the emerging iron deficiency first! Similarly, many of

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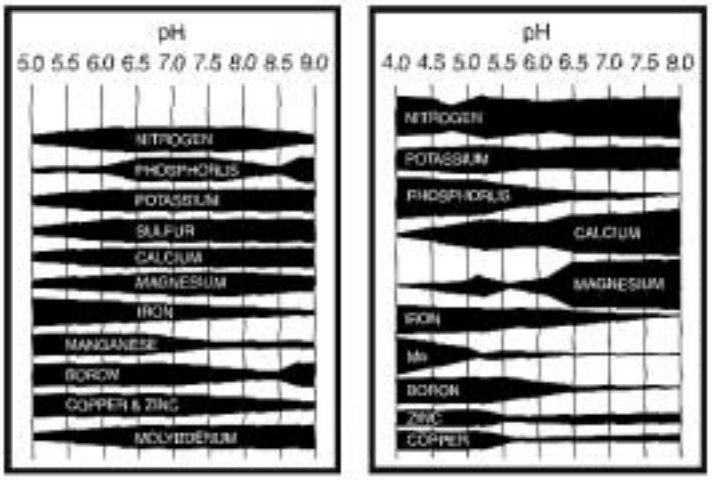
Fugyre 1. How nutrient availability in either soil-based medium (a) or soilless medium varies with pH levels.



a b

Table 1. Optimal medium pH levels for different commercial bedding plant species.

Latin Name	Common Name	Optimal pH Range	Reason
Antirrhinum majus	Snapdragon	5.5-6.2	Difficulty taking up iron/calcium at higher pH
Browallia speciosa	Browallia	5.5-6.2	--
Catharanthes roseum	Vinca	5.5-6.2	Difficulty taking up iron or calcium/ Thelaviopsis susceptibility at higher pH
Eustoma grandiflorum	Lisianthus	6.2-6.8	--
Impatiens hawkeri	New Guinea Impatiens	6.2-6.8	Will take up excessive amounts of Fe and Mn at low pH
Primula vulgaris	Primrose	5.5-6.2	Difficulty taking up micronutrients at higher pH
Pelargonium x hortorum	Geranium	6.2-6.8	Will take up excessive amounts of iron and manganese at low pH
Petunia x hybrida	Petunia	5.5-6.2	Difficulty taking up iron
Salvia splendens	Salvia	5.5-6.2	Difficulty taking up iron/calcium at higher pH
Scaveola aemula	Scaveola	5.5-6.2	Difficulty taking up iron
Sutera spp	Bacopa	5.5-6.2	Difficulty taking up iron
Tagetes erecta	African Marigold	6.2-6.8	Will take up excessive amounts of Fe and Mn at low pH
Torenia fournieri	Torenia	5.5-6.2	Difficulty taking up iron at higher pH
Verbena x hybrida (vegetative only)	Vegetative Verbena	5.5-6.2	Difficulty taking up iron
Viola x wittrockiana	Pansy	5.5-6.0	Susceptible to Thelaviopsis at higher pH

pH, ontinued from page 11

the new vegetatively propagated annuals also have pH preferences that are specific. For instance, Scaveola will express iron deficiency when pH levels reach 6.5.

In contrast to medium pH limiting nutrient availability, many of us learned "the hard way" that New Guinea impatiens, seed geraniums and/or African marigolds grown at medium pH levels less than 6.0 will develop iron and/or manganese toxicity. This nutritional problem occurs because these species are very efficient in taking up iron and manganese. When medium pH levels decrease, and iron and manganese become very available, these plants take up too much iron and manganese and can literally kill themselves!

Lastly, media pH can affect susceptibility of plants to a disease or disease growth, itself. For instance, when medium pH levels exceed 6.2-6.5 the susceptibility of plant species to *Thelaviopsis* increases dramatically. For this reason, pansies, or other species susceptible to *Thelaviopsis*, should never be grown at medium pH levels over 6.0! If pH levels exceed 6.5, consider drenching with Cleary's 3336 (8oz/100 gallons).

The table on the previous page (Table 1) shows optimal medium pH ranges for different plant species. As shown in this table, the basis for differences in optimal pH among species differs. Along with showing which species will show which problems, each of these species is a good 'indicator plant' for either low or high pH problems. The only problem is, by the time you see a problem, it has been happening for awhile and crop growth has already been reduced!

MINNESOTA COMMERCIAL FLOWER GROWERS BULLETIN

University of Minnesota Extension Service

MNLA Minnesota Nursery & Landscape Association

Published by the University of Minnesota Extension Service and Horticulture Department in cooperation with the Minnesota Nursery & Landscape Association

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The Bulletin is published under the auspices of the Commercial Flower Growers Committee of the Minnesota Nursery and Landscape Association.

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