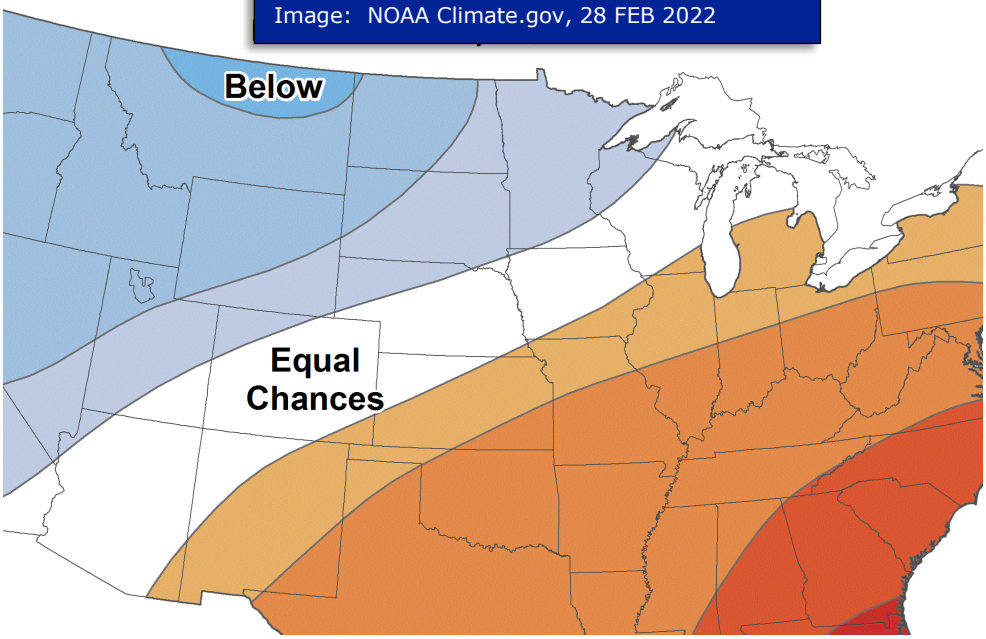
KENTUCKY NURSERY BULLETIN

UK NURSERY CROPS TEAM — FEBRUARY 2022

Warmer and Wetter than Average March Predicted

The NOAA's Climate Prediction Center is forecasting for above average temperatures and above average rates of precipitation for the entire month of March across the Commonwealth.

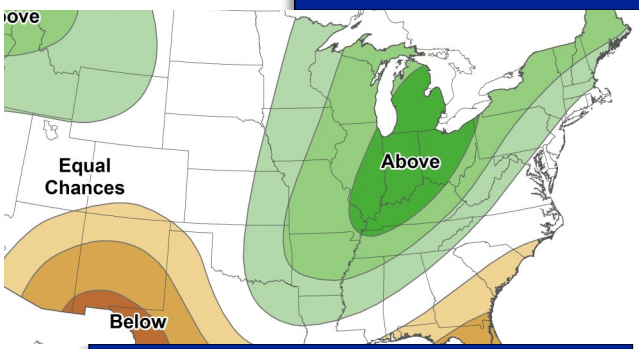
It should be noted that warmer overall predictions do not preclude the possibility for isolated cold weather events, which can be particularly damaging to new plant tissue emerging in spring. Short duration cold weather events after prolonged warmer weather as we move towards the growing season are of particular concern to growers for this reason.



Temperature Probability, March 2022

Image: NOAA Climate.gov, 28 FEB 2022

See **UKAg Weather's Long Range Outlooks** for a variety of forecasts of temperature and precipitation probabilities.



Precipitation Probability, March 2022

Image: NOAA Climate.gov, 28 FEB 2022

College of Agriculture, Food and Environment
Cooperative Extension Service

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- **KHC and UK Request KY Nursery Grower Input in Needs Assessment Survey**

Jar Test: Determining Fertilizer Solubility and Compatibility

Dr. W. Garrett Owen, Extension Professor, Controlled Environment Horticulture (UK)
Dr. Brian Whipker, Extension Professor, Commercial Floriculture (NC State)

Excerpted from e-Gro, full article here: http://www.e-gro.org/pdf/2022-11-08.pdf

Not all fertilizers are compatible when mixed to formulate stock solutions. Using the jar test will help determine fertilizer compatibility and unpredicted chemical reactions.

Blending constituent fertilizer salts is a science. Growers must be aware of solubility limits. Solubility limits essentially refers to the maximum concentration of a particular fertilizer salt (solute) that may be dissolved in water (solvent) to form a nutrient solution. When the appropriate concentration of a fertilizer salt is added to water, the ions will dissolve and form an unsaturated solution. However, when a high concentration of a fertilizer salt is added to water, a saturated solution is formed, and excess solute is present which is observed as solids at the bottom of a fertilizer stock container. In addition, solution temperature will also dictate solubility. Increased solubility will typically occur at warmer than cooler solution temperatures.

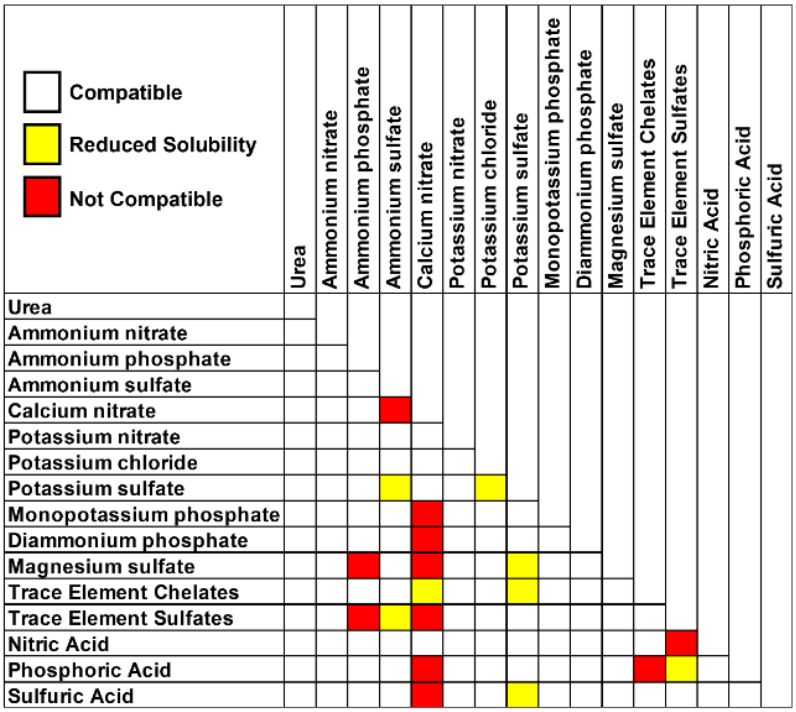

Figure 1. Solubility and compatibility of common fertilizer salt constituents.

Figure by: W. Garrett Owen.

Mixing incompatible fertilizers or other additives together in a stock solution can be harmful to injector equipment and crop nutrient status. This is the primary reason for implementing an A–B tank or multi-head injection system. Figure 1 illustrates common fertilizer salts and acids that are compatible, incompatible, or have reduced solubility when mixed in a stock solution.

The Jar Test

Growers can implement the jar test to determine fertilizer compatibility and unpredicted chemical reactions from other water-soluble additives, minerals, pesticides, and water treatments. Before conducting a jar test (Fig. 4), one will need to gather clear 1-quart jars or containers.

To perform a jar test, follow these simple steps to determine fertilizer compatibility:

1. Calculate desire concentrations of fertilizer to be dissolve in 1 to 2 quarts of water.
2. Obtain clear jar.
3. Add water.
4. Add fertilizers and dissolve.
5. Mix and cap jar. Let stand for 12- to 24-hours.
6. Observe the jar for any cloudiness or if precipitation or solids formed

By following these steps, one will be able to determine fertilizer compatibility and unpredicted chemical reactions before they occur and mitigate the likelihood of nutritional disorders or equipment damage.

e-GRO (Electronic Grower Resources Online) is a collaborative effort of floriculture specialists to create a new clearing house for alerts about disease, insect, environmental, physiological and nutritional disorders being observed in commercial greenhouses. Information is available about disorders, podcasts, and research. Bringing together some of the leading specialists from universities around the USA, e-GRO is a free resource and learning tool for anybody involved in greenhouse plant production. **Subscribe here:** http://www.e-gro.org/subscribe.php

PourThru Method for Large Containerized Crops

Dr. W. Garret Owen, Extension Professor, Greenhouse and Controlled-Environments

Excerpted from e-Gro, full article here: **http://www.e-gro.org/pdf/2021-10-10.pdf**

The PourThru method is a great procedure to determine the nutritional status of containerized crops. This Alert outlines the steps needed to perform a PourThru on larger containers for mix combination planters, herbaceous perennials, and nursery or specialty crops.

Figure 1. Large containers ranging in volume from 1 to 10+ gallons are often used to produce mixed combination planters (A), tropical foliage plants (B), herbaceous perennials (C), nursery stock (D), greenhouse food crops (E), and hemp (F). Photos by: W. Garrett Owen.

Large containers are often used to produce annual bedding plants, e.g., combination planters (Fig. 1A), tropical foliage plants (Fig. 1B), herbaceous perennials (Fig. 1C), nursery stock (Fig. 1D), and depending on the production system, sometimes specialty crops such as food crops (Fig. 1E) and hemp (Fig. 1F). Containerized crops grown in soilless substrate overtime can become susceptible to nutritional disorders. These disorders are related to pH drift or fertility [soluble salts also referred to as electrical conductivity (EC)] because of reduced residual limestone effect to buffer substrate pH over long crop cycles and use of controlled-release fertilizers or fertigation, respectively. The PourThru method is a quick and easy technique that allows growers to evaluate the nutritional status by determining substrate pH and EC of crops in-house without disturbing the root-zone or sacrificing plant material for nutrient analysis.

PourThru Method for Large Container-Grown Crops

The general procedure to perform a PourThru on large container-grown crops is outlined below:

1. Irrigate 3 to 5 representative plants or the entire crop to container capacity using either clear or fertilizer water if you typically fertigate. To know if you irrigated enough, check or watch to see if water is dripping from container drainage holes. Leaching between 10% to 20% is expected.

2. Wait 30 minutes to 2 hours for equilibration of nutrients in container solution before testing.

3. Calibrate the pH and EC meter before testing by following instructions provided by the manufacture. Leachate pH and EC readings are only as accurate as the last calibration. It is recommended to only use fresh, standard solutions and never pour used solutions back into the original bottle.

4. Place a plastic collection saucer under each container to be sampled.

5. Pour distilled water over the substrate surface, circling the plant. Avoid applying the water to one location on the substrate surface. Table 1 provides values of the volume of distilled water to apply to varying container sizes. Apply enough water to collect 1.7 to 3.0 fl. oz (50 to 90 ml) of leachate each time you sample. However, the amount of water needed to apply will vary with the container size, crop, and environmental conditions.

Continued on next page….

6. Collect leachate from each saucer for pH and EC evaluation. Note, keep leachate samples separated and samples >3.0 oz (90 ml) may cause a dilution effect and provide lower EC readings. Table 1 provides the volume of leachate collected for the volume of distilled water applied to varying container sizes.

7. Test leachate samples and record the pH and EC values for the specific crop and cultivar. Testing should be performed as soon as possible. Leachate pH can change within 2 hours of sampling and minimizing leachate evaporation will result in little change for EC values.

8. Interpret results of the leachate samples (Fig 7C). Table 2 provides optimal pH and EC levels of containerized perennial, nursery, and specialty crops. For other crops not listed, use the **e-GRO Nutritional Monitoring Advisor** and search by scientific name.

Crop	pH	EC (mS/cm)
Herbaceous Perennials		
Hyssop (*Agastache foeniculum*)	6.0 - 6.5	1.3 - 2.0
Tickseed (*Coreopsis* sp.)	5.8 - 6.2	1.3 - 2.0
Blanket flower (*Gaillardia aristate*)	5.8 - 6.2	1.3 - 2.0
Coral bells (*Heuchera* sp.)	5.8 - 6.2	1.3 - 2.0
Hosta (*Hosta* sp.)	5.8 - 6.5	1.3 - 3.0
Shasta daisy (*Leucanthemum* sp.)	5.8 - 6.5	1.3 - 3.0
Lavender (*Lavandula* sp.)	5.8 - 6.2	1.3 - 2.0
Miscanthus (*Miscanthus* sp.)	5.8 - 6.5	2.0 - 3.0
Russian sage (*Perovskia atriplicifolia*)	5.5 - 6.2	2.0 - 3.0
Perennial sage (*Salvia nemerosa*)	5.5 - 6.2	2.0 - 3.0
Nursery Stock		
Barberry (*Berberis* sp.)	5.8 - 6.2	2.0 - 3.0
Boxwood (*Buxus* sp.)	5.8 - 6.2	2.0 - 3.0
Butterfly bush (*Buddleja davidii*)	5.8 - 6.2	2.0 - 3.0
Euonymus (*Euonymus* sp.)	5.8 - 6.2	2.0 - 3.0
Forsythia (*Forsythia* sp.)	5.8 - 6.2	2.0 - 3.0
Gardenia (*Gardenia* sp.)	5.5 - 5.8	1.3 - 2.0
Holly (*Ilex* sp.)	5.8 - 6.2	2.0 - 4.3
Juniper (*Juniperus* sp.)	5.8 - 6.2	1.3 - 2.0
Rose (*Rosa* sp.)	5.8 - 6.2	2.0 - 3.0
Viburnum (*Viburnum* sp.)	5.8 - 6.2	2.0 - 3.0
Specialty Crop		
Hemp (*Cannabis satvia*)	5.8 - 6.2	1.0 - 2.5 (Development stage dependent)

Table 2. Optimal pH and electrical conductivity (EC) ranges determined by the PourThru method of containerized perennial, nursery, and specialty crops grown in soilless substrates.

9. Take correction action. Correction procedures for modifying substrate pH and EC are outlined in **e-GRO Alert 7.2**. By following these steps, growers will be able to determine the substrate pH and EC of their large containerized crop(s); mitigate nutritional disorders; and determine if correction procedures are required.

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KHC and UK Request Kentucky Nursery Grower Input in Needs Assessment Survey

Tara Watkins, Extension Associate, Nursery Crops

The Kentucky Horticulture Council (KHC), in conjunction with the University of Kentucky (UK), are seeking the input of all Kentucky nursery growers, including operations producing containerized and in-ground trees, woody ornamentals, and herbaceous perennials for the wholesale market.

The purpose of this survey is to identify and assess the Kentucky nursery industry's current needs and preferences. The survey will cover items such as top business and production concerns, preferences for how you receive educational materials, and more. Conducting this needs assessment survey allows us to direct our efforts to serve you in the best way we can in the coming years, and we greatly appreciate your consideration in participating.

Please take a few minutes to complete this quick grower survey. There are two easy ways to access the survey.

Please click the following link to be taken directly to the survey

https://www.surveymonkey.com/r/2022KYNursery

or you can scan the QR code with the camera on your smart phone:

The survey is 10-15 minutes in length. All individual responses will be kept confidential. If you have any problems, questions, or concerns, please reach out to Tara Watkins, the Nursery Crops Extension Associate. She can be reached at **tara.watkins@uky.edu** or at (859) 257-0037.

We sincerely thank you for your participation. Your input is greatly valued!

The University of Kentucky's **Nursery Crop Extension Research Team** is based out of two locations across the bluegrass to better serve our producers.

The **University of Kentucky Research and Education Center (UKREC)** in **Princeton** serves western Kentucky producers while our facilities and personnel on main campus in **Lexington** serve central and eastern Kentucky producers.

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