transportation costs to heavily populated market areas to decide whether to ship small plants or rooted cuttings to certain areas or to ship the finished plant material, etc.

Variety Stores and Grocery Chains really were out to sell plants in the year 1959, and a remarkable record was established. Many variety chains devote as much as 20% of their space to their Horticulture Department.

There are some who will argue with the estimated figure I have given, and it's true that $15 million is indeed a fantastic sum, but until proven different, I will stick to my guns and question any lower figure that is thrown my way.

I have not been asked to gaze into a crystal ball and forecast the future. However, intense competition is foreseen for the early 60's – It should and probably will stabilize the industry. It may even threaten the end of the inefficient producer and provoke the idea that remedial action should be taken. That is, steps to improve all of our operations; quality of plant material sent to market, realistic pricing procedures, scheduling of crops for seasonal high and low sales periods, product promotion, and public education for a broadened market, may soon be the rule rather than the exception.

But even as I stand here saying this, I'm sure there are growers who are very optimistic about the future. Well – aren't we all!

ESTABLISHING A CRITICAL LEVEL FOR AVAILABLE IRON FOR GARDENIAS WITH THE MODIFIED COMBER SOIL TEST

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Gardenias are popular with Florida gardeners because they bear quantities of beautiful, white, fragrant flowers amidst dark, waxy-green leaves. These shrubs are grown widely both as pot plants and as landscape specimens in all sections of Florida. Like azaleas, gardenias have their cultural problems (1), especially for the controlled need for iron. As with azaleas, when iron is deficient, gardenias are stunted, flowering is sporadic or suppressed, and foliage is chlorotic.

Iron deficiency is generally controlled by adjusting the soil reaction (2, 3, 10 and 11), with applications of iron in one of several forms to correct the inavailability of the element.

While working with Formosa azaleas, Edson and Watkins (5 and 6) developed a modified Comber soil test for available iron and used this to demonstrate the range of iron that would satisfy the needs of that popular landscape shrub. In the research reported herewith, the writers used the same test to study the range of iron required by gardenias and to establish the point at which chlorosis appears.

Materials and Methods

Gardenia plants (*Gardenia jasminoides* var. *Veitchi*), in pots and in landscape plantings, were employed in this experiment. A series of one-year-old potted gardenias was set in one-gallon clay pots with a mineral soil that contained about 8 percent organic matter. All pots were given equal treatments of proprietary fertilizer which contained a small amount of iron. Beginning with a control pot, increments of saturated limewater were added to each pot to establish a range in soil acidity from pH 4.0 to pH 7.0.

The pots were set out of doors and they were kept moist at all times. Chlorotic leaves appeared in the high-lime (alkaline) pots late in the third month. Leaves on plants in low-lime (acid) pots remained dark green throughout the experiment. Soil samples were taken and air dried for future testing. Soil samples were taken and air dried for future testing. Soil samples were also taken from around chlorotic individuals and from under thrifty green plants in the same landscape planting.

Procedure for Sampling and Testing

Soil sampling: Soil cores were taken vertically down to a depth of three inches with a small sampling tube. Composite samples were air-dried and passed through a 20 mesh screen.

Portions of the dry, screened soil were used for all of the tests.

Reagents: Five grams of pure potassium thiocyanate were dissolved in a mixture of 900 ml. of acetone and 100 ml. of ethyl alcohol.

CAUTION: This reagent is both poisonous and inflammable.

Barium powder: A portion of pure barium sulfate powder is stored in a convenient wide-mouth container.

Iron standards: Several iron standards are prepared by treating an acid water solution of iron sulfate with the iron reagent. These standards range from 0 to 15 p.p.m. of Fe.

Procedure: The iron reagent is carefully poured to a 10 ml. mark on a 16 mm. x 120 mm. wide-lipped test tube. To this is added one level, firmly packed teaspoon of screened soil and followed by adding ¼ level teaspoon of barium sulfate powder. The tube is stoppered with a clean rubber stopper and shaken for about one minute. After shaking, the tube is placed in a rack to settle for about 5 minutes. The resultant color can be estimated or compared with known iron standards for reporting the results.

Results and Conclusions

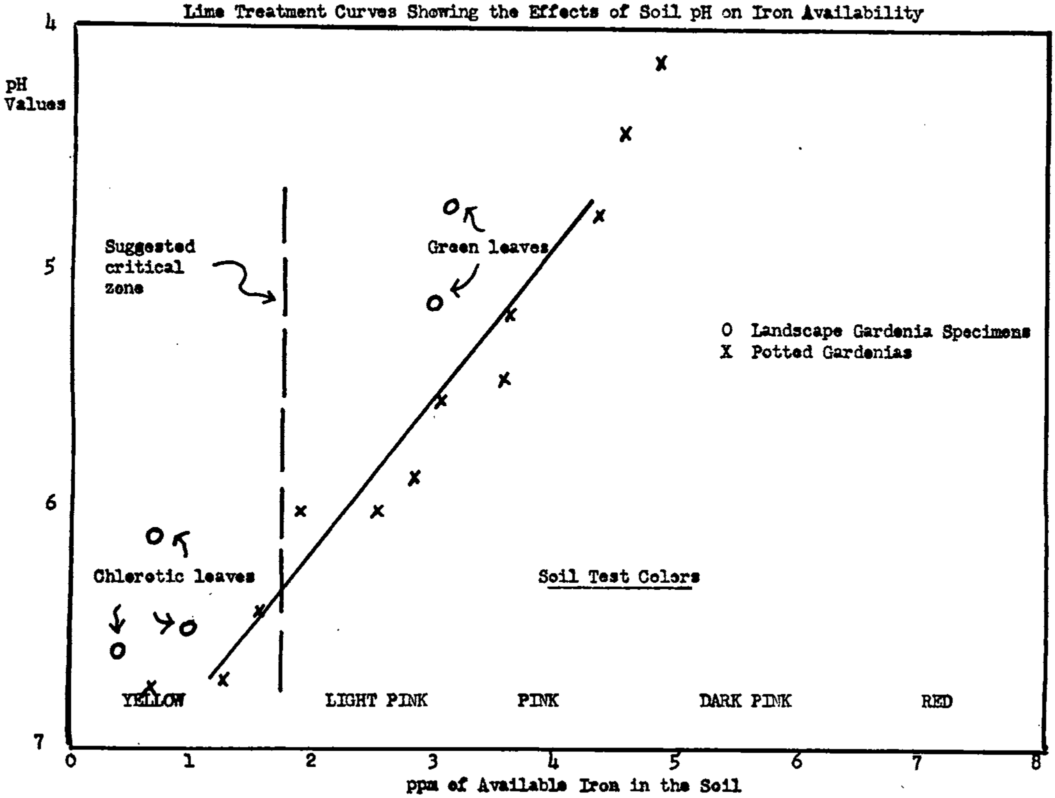
Following the techniques and using the field ratings of Edson and Watkins (6), a suggested critical level for available iron is now offered for landscape-grown gardenias (Figure 1).

The results of the tests show that gardenias are similar to azaleas in their need for iron, the critical level between chlorotic and normal green leaves being slightly higher for gardenias. The change from yellow foliage to green occurred when minute amounts of iron (1ppm-2ppm) were available to the plant. This amount would still be very small even when considering other possible forms of iron that may be absorbed by the plant.

Correctional sprays of ferrous sulphate may supply 1000 ppm or more of soluble iron, but

Figure 1.

Lime Treatment Curves Showing the Effects of Soil pH on Iron Availability



plants can make use of only a very small fraction of this total amount. Iron from such sprays is quickly fixed by the soil into forms that are unavailable to plants. More of this fixed iron becomes available in acid soil which accounts for the reason that this type of soil (pH 4 – pH 5) is always recommended for gardenias.

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BACTERIAL BUD BLIGHT OF CHRYSANTHEMUM

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A bacterial disease of *Chrysanthemum morifolium* Ram. causing bud blight and floral distortion has occurred in Florida. This disease, apparently new to the United States, was discovered near Stuart, Florida, in the winter of 1959-60. District Plant Inspector E. W. Campbell, State Plant Board of Florida, requested assistance from the Plant Pathology Department and an investigation was initiated. A survey, begun on November 19, 1959, revealed that the disease was limited to one farm of about 5 acres. The damage was widespread, with the infection ranging from 10% in some beds to 70% in others. Severity of the attack varied with the varieties being grown and affected flowers were rendered valueless to the grower. Isolations made from diseased plants consistently yielded a creamy-colored bacterium.

Bacterial blights of chrysanthemum species have been reported from scattered areas of the world. Welles and Roldan (9) described a bacterial wilt of *Chrysanthemum coronarium* L. caused by *Pseudomonas solanacearum* Erw. Smith in the Philippines. Williams (10) reported a disease of outdoor chrysanthemums in England, the principal symptom being a drooping of the blooms caused by peduncle collapse. The pith tissue of the peduncle and succulent stem was brown in color 2-3 inches below the bud. The bacterium was described but not named. Stapp (8) reported a leaf blight from Germany being caused by *Pseudomonas syringae* van Hall. Burkholder *et al* (3) described a bacterial blight causing necrosis and collapse of stems. This disease was found initially in New York state, and was later reported from several other states including Florida. The causal organism was described, and named *Erwinia chrysanthemi* Burkholder *et al.*

Symptoms of Bacterial Bud Blight

The field symptoms, exhibited by various plant parts under conditions favorable to spread and development of the disease, are as follows:

Infected Buds. – The first symptom of bud infection is a blackening of involucral bracts (Fig. 1-A). This infection spreads through the bracts into the receptacle and peduncle. This is followed by a collapse of the peduncle and falling over of the flower bud (Fig. 1-B). When a diseased bud is split longitudinally, blackening of the bracts, receptacle, and peduncle, extending many times into the pith of succulent stems, is noted (Fig. 1-C). The distance of disease spread into the peduncle and stem is dependent upon stem succulence. Buds that have started to open and show color generally appear resistant to infection, but in some cases floral distortion occurs. To the casual glance the symptoms are very much like those of Ascochyta petal blight (Fig. 1-D).

Infected Leaves. – Leaf infections are initially observed as water-soaked areas either on marginal tips or in the center of leaf blades. The older lesions turn brown to black and have irregular water-soaked margins (Fig. 1-E). Upon drying, the cells collapse and the tissue turns a light tan to brown color. Infection