

# New York State Flower Growers

INCORPORATED

BULLETIN 135

Secretary, Harold B. Brookins, Orchard Park, N. Y.

March, 1957

## POTASSIUM

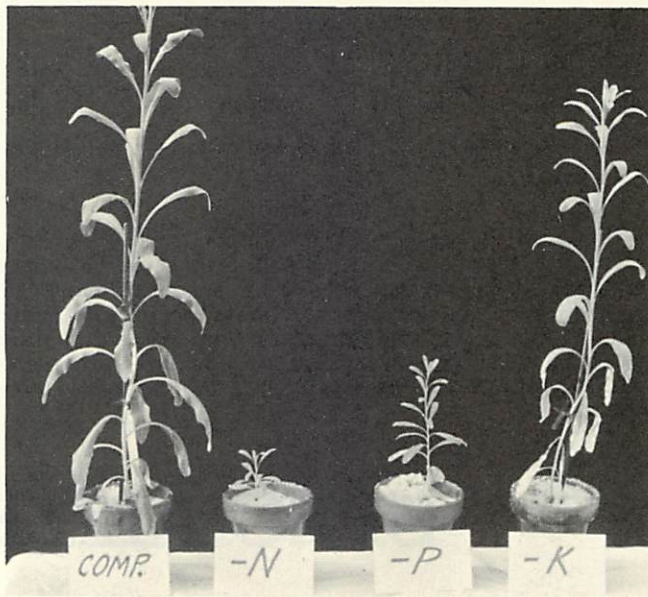
The chemical symbol for potassium is K. This is the initial letter of the alchemists word Kalium used to signify potash before the beginning of modern chemistry. Potassium is in the chemical family called alkali metals and as such is similar in many chemical properties to sodium and lithium. It composes about 2.6% of the earth's crust most of which occurs in the sea waters of the earth. There are deposits of potassium salts available to man, however, in the mines of Stassfurt, Germany in New Mexico. It is calculated that the Stassfurt mines alone could supply the world needs for potash for the next thousand years. The United States is now capable of supplying its own needs for potash and is capable of exporting.

Pure potassium has little use and was not prepared until 1807 by Davy. While passing an electric current through molten caustic potash he noticed silvery globules that burst into flame. He became so excited that he began to dance and it was some time before he could control himself to continue his experiments! Few people become this excited over potassium today. In its pure state potassium is a silvery metal that is chemically very active. When placed in contact with water it causes the water to break down, liberating hydrogen which is ignited by the heat produced causing an explosion and a violet flame. This made Davy dance! Nearly all potassium compounds are soluble including all of those used in fertilizers. The mixing of fertilizers accounts for 94% of the potash mined.

In virgin soils, particularly those of clay origin, potash is never limiting for plant growth. This is because the clay particle is composed of a potassium mineral which becomes soluble after weathering. Excessive leaching can carry away this soluble salt and induce a temporary deficiency which is soon alleviated by breakdown of more clay. Sandy soils are often deficient because the sand particles contain no potash. Plants remove rather large quantities of potash. They have the unfortunate ability of using more than they need when an excess is available. In this respect they are like people at the dinner table. In humans this trait is called gluttony; in plants it's luxury consumption.

Cultivated soils may or may not have sufficient potash. If crop residues and manures are returned to the field, most potash is returned also. Relatively little potash is in the grain. If all crops are removed, potash may be depleted to the point where the decay of soil particles cannot release enough to supply the crop. When this occurs additional potash must be added. Since most crops are removed, farmers regularly add potash to their soils. Excessively heavy or frequent applications of potash are wasteful of time and money since some will be lost by leaching, some will be consumed by the crop without improving yield and the remainder may be fixed in a form similar to mica. This fixed form is like a bank account, however, and can be drawn on at some future time. Generally, we cannot depend on the release of fixed potash for floriculture crops as we need it too quickly. There is some evidence that plant roots can absorb potash directly from

the fixed mica-like form without it being in solution. Most potash enter the roots however, from the soil solution.



Note bleached lower leaves on plant at right

Potassium inside the plant still serves in a mysterious fashion. To date the plant physiologists have not completed the story of the purpose of potassium. It is believed that potassium acts as a catalyst in the formation of sugar and starch and that it plays a direct role in the photosynthetic process. Because it is found so generally throughout the plant and for other reasons, it is also entirely probable that it plays a part in energy transfers. It is interesting to observe that animals are dependent on sodium, an allied element, for proper nutrition and to maintain body water relationships. Animals have no use for potassium, and although most animal bodies contain some, it is there only by accident of diet and is quickly excreted. It is for this reason that manure, when carefully handled and stored, is an excellent source of potash. Most of the potash is in the liquid fractions.

Plants normally do not use sodium, though they may contain small amounts. In some few instances, sodium can replace potassium to a small extent but this offers no cure to a potash deficient crop. Because of the low sodium content of plants, grazing animals are forced to go elsewhere for it.

Potassium deficiencies are not spectacular and in general could also be illustrative of water deficiency. Usually plants are not chlorotic but the lower leaves may show a marginal chlorosis before the margins dry.

The drying and death of leaf margins occurs on the

bottom leaves first and gradually moves up the plant. Rarely is the terminal leaf cluster affected. The plants are often normal in size but the leaves may be distorted at the margin. The florists' stock, *Mathiola incana*, is one of the most sensitive crops to potash deficiency. If it has enough, any other crop will find plenty of potash. Geraniums are also a crop often found deficient in this element though the leaf symptoms are more commonly due to lack of water.

Potassium is added in a soluble form in most cases. Potassium chloride of Muriate of potash are usually used as carriers in this country. In Europe, potassium sulfate is recommended. It probably makes no difference, though potassium chloride will make a bigger contribution to the soluble salt problem.

Potassium Carriers

<u>Name</u>	<u>% Potash</u>	<u>Note</u>
Potassium chloride	48-62	Soluble
Potassium sulfate	47-50	Soluble
Liquified fish	1-3	
Wood ashes	1-8	

Applications of potassium sulfate or chloride should be made at a rate not to exceed one-half pound per hundred square feet of bench soil or per fifty cubic feet of potting soil. Potassium fertilizers can often be added when preparing the soil but since they are soluble, this is not essential. They can be mixed with

other fertilizer salts, without trouble, for liquid application.

Generally, potassium is not as likely to be deficient as it is to be in excess as high soluble salts. When peat moss or sand are added to soils, there is an increased probability that potassium deficiency will occur. Neither peat nor sand contains potash and therefore tends to dilute the potassium present in the original soil.

In the future it may be possible to keep soluble potash in the soil for a longer period of time. Recent research in California indicates that potassium combined with glass and called "frit" will slowly become available when mixed with soil. When this material is more completely tested it may be possible to add superphosphate, fritted potassium and urea-form nitrogen at planting time and never have to fertilize pot plants again.

Stem strength in carnations and in other crops is not associated with potassium fertilization. If any crop is adequately fertilized with potassium, the addition of more will not increase stem strength. If the crop is not adequately fertilized, the addition of potassium or practically any other plant nutrient will improve stem strength because it will increase the efficiency of photosynthesis and make better use of poor winter light. In all cases, it is carbohydrate materials that make stems stiff. Any factor that improves carbohydrate retention or production will improve stem strength.

\* \* \* \* \*

# SPECIALIZED SESSIONS

## POT PLANTS AND BULBS

Moderator - Carl Gortzig  
Reporter - Vere Brummund

Dr. Dimock

Q. Will a low soil pH control *Pythium* and *Thielaviopsis*?

A. A low pH inhibits *Thielaviopsis* but will not control *Pythium*.

Q. What about the use of Fungichromin on *Botrytis* and the residue problem?

A. Fungichrome leaves little or no residue and has given as good control as Captan but is not generally available at present.

Q. What about using Terraclor in the Terraclor, Captan and Fermate combination, will it help to control *Botrytis*?

A. Terraclor gives no control of *Botrytis* when used as a spray on the plants. It is included in the mixture for *Rhizoctonia* control.

Q. How can the grower recognize *Rhizoctonia*, *Pythium* and *Thielaviopsis*?

A. For the last two you will have to examine the roots. With *Pythium* the roots are completely rotted but with *Thielaviopsis* small black lesions are formed on the roots and run parallel with the root. A good deal of experience is needed to tell them apart and laboratory isolations are sometimes necessary. Of course, both

can be present on the same plant. *Rhizoctonia* usually attacks at the soil line of the cuttings or potted *Poinsettias* and the plants topple over.

Q. How can the grower test his soil or gravel in the benches for *Thielaviopsis*?

A. The carrot slice test is specific for this fungus. Take a slice of carrot about 1/8 inch thick and place it on moist toweling in a covered baking dish. Place a spoonful of the soil or gravel to be tested on the upper side and moisten with clear water. Two days later wash off the soil or gravel and replace the carrot slice in the dish, same side up. If you have some dark gray fungus developing on it in about 3 or 4 days you can be almost sure it is *Thielaviopsis*.

Q. What culture practices can the grower use to control these diseases?

A. *Thielaviopsis* can be controlled by complete sterilization or by keeping the growing temperatures at 63-68° and above; *Pythium* by complete sterilization or by keeping the plants on the dry side.

Q. What effect will the higher temperature have on *Poinsettias*?

A. Growing *Poinsettias* at a higher temperature will give a little less color, slightly taller plants and may cause a slight delay.

Q. Is there any soil drench that can be used against Pythium?

A. As yet there is no good soil drench that can be used against Pythium. Captan and Panodrench are somewhat effective and some growers have reported very good results.

Q. Is there any good control for lily root rot?

A. The West Coast is using a Captan-Terraclor bulk dip but we have seen no evidence of control in our tests; neither has soil sterilization helped. The main diseases, Pythium and Rhizoctonia may either be carried on the bulk or picked up from the potting soil or the benches.

Q. What about using peat moss in potting lilies to provide good soil aeration?

A. Peat moss tends to keep the bulbs too moist and consequently, taller. In a pH below 6.0 there is a tendency to get leaf burn or scorch, pH of around 6.5 may be best for lilies. No scorch when pH around 6.9.

Q. Is it possible to infect lilies with root rot placed in benches that have had poinsettias in them?

A. Certain species of Pythium can attack both the lily and poinsettia. We are recommending the use of a bench drench of Terraclor, Captan and Fermate at 1 1/2 lb. each per 100 gal. of water after poinsettias are moved out. This drench also should be used before the poinsettias go on the benches.

Dr. Naegele

Q. How can the grower control aphids on lilies?

A. Systox applied, at the rate of 1 pint per 1000 sq. ft. when planted pot to pot, apply when root activity has begun.

Q. What about the toxicity of Systox to plants and humans?

A. Systox, like parathion, is a phosphate compound and should be handled with extreme care and be sure to observe the manufacturer's directions for use and while using. There has been some injury to bulbous crops and to some varieties of chrysanthemums, especially the lower leaves.

Q. How can the mealy bugs be controlled on Poinsettias?

A. This insect was probably carried over from the stock plants by cuttings. Clean up the stock plants with 3 applications of Sulfatepp or Malathion at 7-10 day intervals before taking cuttings. If they are on propagated plants Malathion after panning and every 3 weeks up to November 13. Sprays or aerosols shouldn't be used when the bracts start to show color. Smokes are the safest when the bracts are colored.

Q. What about the control of resistant mites?

A. Kelthane is not too effective in some ranges. If you suspect resistance it is wise to use combinations of chemicals or alternate the different miticides with each application. Wettable powders of the various miticides have not shown injury to roses or potted mums. For cyclamen mite and the cabbage looper, Endrin has been the most successful.

Q. How can the grower tell whether cyclamen mite or red spider is infecting his crops?

A. The cyclamen mite, causes distortion of the leaf. If there is webbing or spotting of the foliage especially on the underside of the leaf it is probably the red spider.

Q. Is Endrin dangerous to use?

A. Yes. The greatest danger is at the time of application. It does not vaporize readily and has a long residual action.

Q. What is it that girdles the Azalea at the soil line and eats on the roots?

A. Probably one of the many weevils. These are usually found in the fields and brought in with the plants in the fall. We are recommending a soil drench of chlordane, dieldrin or DDT but we can't guarantee control. Better to control the adults in the field with these chemicals starting in June with either sprays or dusts of either chlordane or dieldrin and repeat applications every 10 days.

Q. How can the grower control Soft Brown Scale on Stephanotis? Will systemics work?

A. Systemics will not effect the scale. Applications of Sulfatepp or Malathion will give good control but must be applied when the crawlers are out. If it is the hemispherical scale best control is just after the eggs hatch.

Q. How can we tell which is soft brown scale and which is hemispherical scale?

A. The soft brown scale forms just a small fairly low hump and does not have eggs under the cover. The hemispherical scale forms almost a half sphere shaped cover and is shiny brown.

Q. What about mites on foliage plants?

A. At present, not a problem in New York.

Q. What about Sulfatepp or Kelthane injury on Kalanchoe?

A. After buds have begun to form these chemicals shouldn't be used for they will cause the buds to blast. No injury has been observed up to that time.

Q. What about insects on spring flowering bulbs?

A. The worst one is the tulip bulb aphid and can be controlled with Lindane after the leaves emerge.

Q. What can the grower do for leaf rollers on azaleas in storage?

A. In storage there is very little activity at low temperatures. Parathion has given good control when the plants are started for force. Control should start in the field immediately after planting with monthly applications of Malathion or Parathion alternated with chlorobenzilate. Ferbam should be included in each insecticide spray for control of leaf spot.

Dr. Williamson

Q. How can we control weeds in Azaleas, especially chickweed?

A. Any weed control work should be done prior to planting. Methyl bromide has given good control when said temperatures are 55° + above to a 6" depth. Sterilization can be done about mid-May on Long Island and the soil planted 3 to 5 days later. We actually have found no injury on plants when planted one day later. If the soil is aerated or worked up after treatment you will lose any injurious effect of the chemical. Rate of application: 12 lbs. per 1000 sq. ft.

Q. Which is the most convenient to use--Methyl bromide or Vapam?

A. Methyl bromide is applied as a gas under air-tight cover. Vapam is a water soluble compound and will go down as far as the water does, and must be well aired before planting. If the temperature drops or there is rain after application, it will take longer before planting can be made. Methyl bromide should be covered for 24 hours and can be safely planted 3-5 days later but Vapam requires 2 weeks before it is safe to plant. Some growers may find methyl bromide more convenient, others Vapam.

Q. Can the same equipment be used for applying granular herbicides as is used for fertilizing?

A. Yes, providing the equipment is well washed after using.

Q. How can one test for safety to plant after using Vapam?

A. Better to wait the two weeks time. You can't smell Vapam after 4-5 days even though toxic fumes are still present.

Q. What about an overall control of weeds in the potting soil?

A. Steam sterilization is still the best. Methyl bromide may be used in cases where no steam is available. Chloropicrin should only be used out-of-doors if the temperature is high enough and the soil should be well aerated before bringing back into the greenhouse.

Q. Can Vapam be used in the same building where plants are growing?

A. No, it shouldn't be used under these conditions; many plants are injured by the fumes.

Q. What about carnations and the use of methyl bromide and ethylene dibromide?

A. These materials or any others containing bromine should not be used on this crop. In some cases total loss has occurred where such materials have been used.

Q. How about Methyl Bromide and annual plants?

A. May cause damage to ornamental seeds especially Salvia, Asters, Snaps, Viola ordorata, annual pinks. Still some unexplained difficulties.

Q. Is there any way weeds in Azalea beds or pots can be controlled by chemicals?

A. Anything put on the ground will effect the shallow roots of Azaleas. Granular I. P. C. is being tried a week after planting. Best to treat the beds in fall for spring planting.

Dr. Langhans

Q. In regard to the use of artificial lighting for the forcing of Bulbs on Azaleas how much was the intensity, how long are the lights run and what was the temperature?

A. We are basing our work on that already reported by the Dutch and they recommend either incandescent or fluorescent lights spaced to give about 10 watts per square foot and 30 to 36 inches from light source to floor. We are running the chambers at about 60°F and the lights are on for 16 hours per day.

Q. Should poinsettias be run cool until November 1?

A. No, there would be an excellent choice for delay and also root rot causes the most damage at low temperature.

Q. Should poinsettia stock plants be lighted for the very late propagations?

A. No, we run stock plants under both long and short days this fall and the cuttings from the lighted stock plants did the poorest.

Q. What is the best way to control bud initiation of poinsettia--heat or lights?

A. This year our work showed that high temperatures did not do a good job of preventing bud initiation, therefore, we recommend lighting. Use a mum lighting set-up and start September 20 to 25 and run to October 10. The time clock should be set to turn the light on from 11 p. m. and off at 1 a. m. If you use lighting, the poinsettias will not be early as they were this year.

Q. Should black cloth be pulled on the late propagated poinsettias after they are potted?

A. Yes, if you are able to give the late propagated (after September 15) cuttings an eight or nine hour day it will improve the quality and hasten the flowering.

\* \* \* \* \*

## IN THIS ISSUE

- Potassium
- Specialized Sessions  
Pot Plants and Bulbs

Your editor,



Permission to reprint is granted if credit is given New York State Flower Growers Bulletin Number.