Chapter 1 : Full text of "The effect of large applications of commercial fertilizers on carnations"

The effect of large applications of commercial fertilizers on carnations The effect of large applications of commercial fertilizers on carnations.

Wabash College, M. The author desires to express his appreciation of the many helpful sug- gestions received from Dr. Derick and other members of the departments of Chemistry and Botany. On this account, it was considered desirable to study the causes and effects of overfeeding with the more ordinarily used commercial fertilizers. The fertilizers chosen for the experiment were dried blood, sodium nitrate and ammonium sulfate, acid phosphate and disodium phosphate, and potassium sulfate. For comparison, sodium chloride and sodium sulfate also were used on some sections. Experimental work upon the subject was carried out during the years 19 Carnations are propagated by means of cuttings, and from these it was found impossible to secure a normal growth in either sand or water cultures. Hence, the experimental work was based upon the study of plants grown in soil carefully selected with the view to securing uniformity throughout the benches, watered to give as nearly as possible the same moisture content, and subjected very nearly to identical conditions of heat, ventila- tion, and illumination. For details regarding the type of soil, its prepara- tion, arrangement of sections, etc. Effects of Overfeeding on Condition of Plants. Reversion to monohydrogen phosphate in presence of bases in the soil would further decrease the low solubility of the acid phosphate and by double decomposition with calcium, iron and other bases in the soil render the sodium phosphate first applied less soluble, as pointed out by Cameron and Bell. Tests with litmus paper showed that the surface of the soil, neutral at the beginning of the experiment, became acid seven or eight days after the addition of the dried blood. Soil to which ammonium sulfate was applied became acid as quickly also. Single applications of ammonium sulfate and sodium chloride at the rate of Equal amounts of potassium sulfate, at this time, followed by further applications at intervals of one or two weeks, at the rate of 1. Signs of injury in sections treated in the same manner with sodium phosphate became evident even more slowly, while acid phosphate produced no apparent injury even in the largest applications. The fertilizers may be grouped into the class, easily soluble and pro- ducing almost immediate injury; a second, moderately soluble and pro- ducing delayed injury; and a third, difficultly soluble and producing no apparent injury. On days of continuous sunlight a more or less pro- nounced softness of tissue could be detected by careful observation long before characteristic injuries became apparent. Effects of Overfeeding with Ammonium Sulfate. A complete plasmolysis took place in that portion of the stem located two and three nodes below the bud and in the portion of the stem just above the node, so that the stem bent completely over. The shoots first affected were those with buds one-half to three-quarters developed. At the same time white spots 0. Microscopic examina- tion of these showed the chlorophyll bearing tissue entirely plasmolyzed. In contrast to the injury from other fertilizers, practically every flower split. Later stages resulted in the drying up of the leaf tips, and the appearance of the white depressions upon the older leaves. The sepal tips very early became brown. Later, pustule-like elevations about i mm. The injury from excess of ammonium sulfate was more rapid and pronounced in the presence of lime than without it. Effect of Overfeeding with Sodium Nitrate. Effects from Large Applications of Sodium Chloride. When held within supports the plants appeared normal. Gradually, however, the plants lost their turgidity and the chlorophyll disappeared evenly throughout the entire plant. Tests made in the spring of 19 15 with heavy applications of sodium chloride and potassium chloride 12 kg. Effects of Overfeeding with Potassium Sulfate. Drying up of the tips of the leaves and curling of the leaves upward upon their long axis followed, with often, also, a peculiar inhibition of growth on one edge of the leaf, with the same on the opposite edge of another portion, giving the leaf a wavy outline. A marked stunting of growth was observable. This affected most noticeably the lengthening of the stem, resulting in the later shoots assum- ing a rosette appearance, due to the leaves of normal length upon a stem with undeveloped internodes less than an inch in length. The inter- node in full grown shoots is ordinarily three or four inches long. The edges of the petals of the flowers after about

the middle of January became quite generally withered or crinkled. Those in the center of the flower remained closed quite tightly, while the other two or three rows opened normally. Later, the buds remained closed, although the pistil often pushed its way out and might be seen extending an inch above the top of the bud. A marked increase in exudation of nectar in the flower was found to have caused the gluing together of the petals, and so prevented their opening. On cloudy days very frequently a calyx cup would be found completely filled with this exudation. The exudation was most plentiful in the flowers from plants receiving a moderately heavy application of potassium sulfate over a long period of time while the heavier applica- tions caused a noticeable but less plentiful increase. A small amount of nectar is found in normal flowers, and somewhat larger amounts in the flowers from plants receiving large applications of sodium phosphate, sodium chloride, ammonium sulfate, or potassium chloride, but not so generally nor in such large amounts as in the sections treated with potas- sium sulfate. Injury was less marked when ground limestone was added to the soil, in contrast to the effect of liming on the production of injury by ammonium sulfate. Effects of Overfeeding with Sodium Phosphate. These signs of inhibition became steadily more pronounced until the plants were removed from the benches, about May first. When larger amounts were used as 12 kg. These signs of injury appeared, however, only after the middle of January and then only gradually. Injury was less when the soil was limed than when not. Effects of Overfeeding with Dried Blood. At that time a softness of the petals and irregularity of their arrangement, due to the partial opening of the inner and crinkling of the outer ones, became more or less common. The flowers became susceptible to brown- ing when a drop of water from syringing lodged on a petal in a position to be reached by the rays of the sun. The height of the plants was below normal in the spring but rather above in the fall; the color was good. If the applications of dried blood were not continued after signs of injury became apparent, the plants gradually recovered. The same held true for plants overfed with ammonium sulfate in contrast to those which had been injured by potassium sulfate, sodium phosphate, and sodium chloride. Ash sulfated per cent, of dry weight. The higher values for plants treated with potassium sulfate and sodium chloride over those treated with sodium phosphate correspond to the higher osmotic pressure values obtained from the sap of these plants as well as to the more rapid injury from potassium sulfate. Determination of the total nitrogen and mineral content of the ash from various samples of plants treated with potassium sulfate gave the following values: The figures preceding the letters indicate the ntunber of grams applied weekly per 20 sq. A similar study of plants to which ammonium sulfate had been ap- plied gave the results shown in Table IV. Plants to which sodium phosphate was applied showed a higher phos- phorus content, 0. The intake of sulfur when this fertilizer is used is less than is required for the nitrogen then, but in excess of that required to be combined with the nitrogen determined by MgO. Since injury was greater in sec- tions so treated, the injury is not proportional to the intake of sulfur. The intake of phosphorus was increased by the addition of ammonium sulfate, probably due to acidity developed in the soil. Table V shows the total nitrogen content of some plants from Sections ammonium sulfate and lime and ammonium sulfate. It seems, rather, that MgO has caused some decomposition of the organic material; the error due to this is assumed to be the same in both samples. Section had received but one application at the rate of Analyses were made of upper and lower portions of the plant separately in order to show any localization of nitrogen in the more vigorously grow- ing portion of the plant. I I E upper half dead 2 lower half dead 4. Average values for the plants from Section are 6. In each case the more vigorously growing portion contained the larger percentage of nitrogen and the increase over the lower portion is considerably greater in the section to which the smaller applications were made during the entire season. No clear relation is shown between the nitrogen content and the degree of injury. Considerable tolerance for ammonium sulfate is shown when it was applied to the soil in quantities not heavy enough to produce immediate, serious injury. The fact that the dead plants had no higher total nitrogen content than those only injured is evidence that part of the nitrogen when added in small quantities was changed to a nontoxic form, since the dead plants were in this condition as early as March 21, while the living ones though injured undoubtedly continued to take up the salt in solution until samples were taken. A series of ammonia determinations was made on the sap from "checks" and ammonium sulfate

fed plants of the set of 1 Results are given in Table VI. January 21, 19 Plant Number 4, Section , White Enchantress. A few crystal masses, tetrahedral and often aggregated in shape of a cross, appeared. They were yellow in color. Sap from Number 8, somewhat injured, and Number 12, badly affected, gave these characteristic crystals, also. A section of the leaf showing white blotches was immersed in chloro- platinic acid after removal of the epidermis and allowed to remain over- night. Large and perfect crystals appeared, arranged usually around the injured spot, never in it. A drop of sap from plant Number 4, Section was distilled with a pinch of sodium carbonate over a micro-burner and the distillate caught in a hanging drop of hydrochloric acid in a cover glass placed on a glass ring above it. Why injury of this type is caused by ammonium sulfate in contrast to the even lightening of the color of the whole leaf by the other soluble salts, sodium nitrate and sodium chloride, is not known. The values of o. N as nitrate per cc. II Total solids and ash were determined on the sap of the set of 1 The results, given in Table VII, are calculated to milligrams per cc. The influence of the fertilizer applications is seen in the increase in both values as the applications of any fertilizer were increased in a series of sections. Sample 3 of the first set and 6 and 7 of the second, all of which were from plants to which large applications of potassium sulfate had been made, showed particularly high values. The actual value for total solids depended on the length of heating but experiments with both sets of data given showed the same relative values after several successive heatings. The low chloride content obviates the danger of volatilization of potassium chloride by high temperatures. The same dis- crepancy is seen in the osmotic pressure data for these two sets. Drying on the water bath was found to cause charring of the sap from plants which had been treated with ammonium or potassium sulfate. The first showed a higher acidity value, the second a higher sugar content.

Chapter 2 : Horticulture :: Flower Crops :: Carnation

Excerpt from The Effect of Large Applications of Commercial Fertilizers on Carnations Examination was made for starch in carnation leaves taken from the plant after a day of sunshine by boiling them for some time in alcohol, then in water, and testing leaf sections with an alcoholic solution of iodine; starch was found to be plentiful.

While chemical fertilizers have their place increasing plant nutrients in adverse weather conditions or during times when plants need additional nutrients, there are also several harmful effects of chemical fertilizers. Some of the harm chemical fertilizers may cause include waterway pollution, chemical burn to crops, increased air pollution, acidification of the soil and mineral depletion of the soil. The use of chemical fertilizers on crops can have adverse effects on waterways caused by chemical run off of the excess fertilizer. The over-abundance of nutrients in the water reduces the amount of oxygen. The existing organisms living in the water use up the oxygen that is left. The result is oxygen depletion causing the fish to die. Chemical fertilizers are high in nutrient content such as nitrogen. Over-application of chemical fertilizer to plants may cause the leaves to turn yellow or brown, damaging the plant and reducing crop yield. This condition is known as chemical leaf scorch. Leaf scorch can cause the leaves of the plant to wither and may cause the plant to die. Increased Air Pollution credit: Excess nitrogen used in crop fertilization can contribute to the release of greenhouse gases such as carbon dioxide and nitrous oxide into the atmosphere. This effect is caused by using a greater amount of chemical fertilizer than the plants can readily absorb. According to the National Oceanic and Atmospheric Administration NOAA Climate Monitoring and Diagnostics Lab, excess greenhouse gases trapped in the atmosphere may be contributing to the increase of land and ocean surface temperatures. The over-use of chemical fertilizers can lead to soil acidification because of a decrease in organic matter in the soil. Nitrogen applied to fields in large amounts over time damages topsoil, resulting in reduced crop yields. Sandy soils are much more prone to soil acidification than are clay soils. Clay soils have an ability to buffer the effects of excess chemical fertilization. There is an increasing concern that continuous use of chemical fertilizers on soil depletes the soil of essential nutrients. As a result, the food produced in these soils have less vitamin and mineral content. According to data produced by the U. Department of Agriculture Nutrient Data Laboratory, foods grown in soils that were chemically fertilized were found to have less magnesium, potassium and calcium content.

Chapter 3 : Negative & Positive Effects of Pesticides & Fertilizer | Home Guides | SF Gate

effects of large applications of commercial fertilizers on carnations. Article in Journal of the American Chemical Society 38(12) Â· May with 5 Reads DOI: /jaa}.*

Nitrogen-containing fertilizers can cause soil acidification when added. Accumulation of toxic elements[edit] Cadmium[edit] The concentration of cadmium in phosphorus-containing fertilizers varies considerably and can be problematic. Continuous use of high-cadmium fertilizer can contaminate soil as shown in New Zealand [55] and plants. Consequently, the widespread use of phosphate fertilizers has increased soil fluoride concentrations. The most common toxic elements in this type of fertilizer are mercury, lead, and arsenic. Highly pure fertilizers are widely available and perhaps best known as the highly water-soluble fertilizers containing blue dyes used around households, such as Miracle-Gro. These highly water-soluble fertilizers are used in the plant nursery business and are available in larger packages at significantly less cost than retail quantities. Some inexpensive retail granular garden fertilizers are made with high purity ingredients. Trace mineral depletion[edit] Attention has been addressed to the decreasing concentrations of elements such as iron, zinc, copper and magnesium in many foods over the last 50â€”60 years. In Western Australia deficiencies of zinc , copper, manganese , iron and molybdenum were identified as limiting the growth of broad-acre crops and pastures in the s and s. The effects can be combined into an equivalent amount of carbon dioxide. The amount varies according to the efficiency of the process. The figure for the United Kingdom is over 2 kilogrammes of carbon dioxide equivalent for each kilogramme of ammonium nitrate. Atmosphere[edit] Global methane concentrations surface and atmospheric for ; note distinct plumes Through the increasing use of nitrogen fertilizer, which was used at a rate of about million tons of N per year in , [90] [91] adding to the already existing amount of reactive nitrogen, nitrous oxide N2O has become the third most important greenhouse gas after carbon dioxide and methane. It has a global warming potential times larger than an equal mass of carbon dioxide and it also contributes to stratospheric ozone depletion. These emissions contribute to global climate change as methane is a potent greenhouse gas. In , Chinese governments have started to partially withdraw fertilizer subsidies, which also include contributions to fertilizer transportation, electricity and natural gas use in the industry. Because of this, professional farmers who run large-scale farms have already used less fertilizers since then under the fertilizer prices went up. If large-scale farms keep reducing their use of fertilizer subsidies, they have no choice but to optimize the fertilizer they have which would therefore gain an increase in both grain yield and profit. The former encourages soil fertility using local resources to maximize efficiency. Organic agriculture avoids synthetic agrochemicals. Conventional agriculture uses all the components that organic agriculture does not use. History of fertilizer Management of soil fertility has been the preoccupation of farmers for thousands of years. Egyptians, Romans, Babylonians, and early Germans all are recorded as using minerals and or manure to enhance the productivity of their farms. John Bennet Lawes , an English entrepreneur , began to experiment on the effects of various manures on plants growing in pots in , and a year or two later the experiments were extended to crops in the field. One immediate consequence was that in he patented a manure formed by treating phosphates with sulfuric acid, and thus was the first to create the artificial manure industry. In the succeeding year he enlisted the services of Joseph Henry Gilbert , with whom he carried on for more than half a century on experiments in raising crops at the Institute of Arable Crops Research. A factory based on the process was built in Rjukan and Notodden in Norway, combined with the building of large hydroelectric power facilities. A maize crop yielding 6â€”9 tonnes of grain per hectare 2. In the s, the Tennessee Valley Authority National Fertilizer Development Center began developing sulfur-coated urea; sulfur was used as the principal coating material because of its low cost and its value as a secondary nutrient. They typically provide 6 to 16 weeks of delayed release in turf applications. When a hard polymer is used as the secondary coating, the properties are a cross between diffusion-controlled particles and traditional sulfur-coated.

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Chapter 4 : The effect of large applications of commercial fertilizers on carnations, - CORE

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Netting for plant support: Hence the crop needs support while growing. Good support material is metallic wire woven with nylon mesh. At every two meters the wire should be supported with poles. The poles at both the ends of bed should be strong. Metallic wire is tied around the bed along the length with the support from supporting poles. Across the bed, nylon wires are woven like net. For an optimum support, an increasing width of the meshes can be used. Bottom net can be of 10x10cm, then two nets of Pinching Depending upon the need of crop spread, single, one and a half or double pinch method is adopted. Ideal time for pinching is early morning. When the plant attains 5 nodes, the first pinch is given. This would give rise to six lateral shoots. Pinching in Carnation Disbudding In standard carnations, side buds should be removed whereas in spray carnations, the terminal bud has to be removed. Feeding on young leaves results in distorted leaves as they continue to grow. Older leaves may display patches of chlorolic spots. Nymphs and adults suck the sap from the leaves, stems and flower buds in colonies. Thrips tabaci Damage symptom Both the nymphs and adults suck the sap from leaves and flower. They excrete brown droplets, which afterwards true black. Leaves may fade and shrivel in case of heavy infestation and foliage becomes silvery. Control measures Spraying of Fipronil 1. Thrips infested Red spider mites-Tetranychus urticae Damage symptom These have ability to produce fine silk webbing, spider mites are very tiny and very small and are difficult to identify. They suck sap from the leaves which results in tiny yellow or white speckles. Once the foliage of a plant becomes bronze it often drops prematurely. Heavily infested plant may be discoloured stunted.

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Chapter 5 : Carnation cultivation guide () - Agriculturegurujі

*The purpose of the investigation was to determine the effects upon the plants of large applications of certain commercial fertilizers to the soil on which carnations were grown. * Brown and Morris* state that preluninary washing with cold water as in the O'Snllivan method, is unnecessary in Tropaeolum majus.*

Want to learn more about how I do that? Understanding the Effects of Chemical Fertilizers The effects of chemical fertilizers are not widely spoken about. This is partially because they are largely untested. To really understand this issue, we need to understand what chemical fertilizes actually do. Fertilizer is any substance used to add nutrients to the soil to promote soil fertility and increase plant growth. Soil health relies on a balance of macronutrients and micronutrients, as well as microbial health. In the past scientists once thought food only consisted of macronutrients, but have since discovered micornutrients, antioxidants and so on. The same goes for soil health: Unfortunately, as unsustainable farming and gardening practices continue our soil is stripped of its health and we depend on amendments even greater. This leads to some pretty negative effects of chemical fertilizers. Negative Effects of Chemical Fertilizers The biggest issue facing the use of chemical fertilizers is groundwater contamination. Nitorgen fertilizers break down into nitrates and travel easily through the soil. Because it is water-soluble and can remain in groundwater for decades, the addition of more nitrogen over the years has an accumulative effect. At the University of Wisconsin, Madison, they discovered the effects of chemical fertilizers are compounded when mixed with a single pesticide. These influences "portend change in ability to learn and in patterns of aggression. In infants it is alternatively known as Blue Baby Syndrome. The risk most often occurs when infants are given formula reconstituted with nitrate contaminated water. Nitrogen groundwater contamination also contributes to marine "dead zones". The increase in the water-soluble nitrates creates an influx of plant-life, which eats up oxygen and starves out fish and crustaceans. This has an impact not only on the aquatic ecosystem, but on local societies who depend on food sourced from those areas. Yes, you heard me right. The risk of disease is obvious and high9, 10 and this practice should never be confused with "humanure", a long, highly involved process of decomposing human waste into a safe resource. Knowing how to protect our health is what counts. Support organic and sustainable agriculture. Know your farm and your farmer and understand their practices. Learn how to prioritize organic foods in your budget. Take part in safeguarding organic practices and standards. Visit Organic Consumers for details. Learn more about organic fertilizer for your own garden. Stay informed, get involved and make a difference in our health.

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Chapter 6 : The effects of large applications of commercial fertilizers on carnations - CORE

Title. The effect of large applications of commercial fertilizers on carnations, By. Muncie, Fred Weaver. Genre. Book Material Type.

It is cultivated for large-scale production. Micro carnation is used for as ornamental pot plants. The best EC during vegetative phase is 1. And throughout the generative period is 1. The different Procedures of sterilization are: Not possible for Indian Solarization: Cover the ground with vinyl for 6 â€" 8 months. Sunrays will heat Up the dirt, which will kill many parasites. Chemical wet the beds with irrigation water. Apply this solution evenly on soil beds. After that in 4 to 6 hours the crop can be planted. Plantation can be performed out 4 to 6 hours following fumigation. Destroys almost any fungal, viral and bacterial existence in addition to larva and eggs of these pests in the soil. Stable in a broad assortment of temperature and pH. Climate 1 Temperature Temperature is the Significant factor that affects the development And flowering of carnation. The perfect environment for carnation production needs to have a cold but steady temperature, low humidity and long days with high light intensity. Finest grade carnations are made in areas having high light intensity through winter and at the same period, the temperatures during summer months are mild. In case of carnation growing, moderate temperatures are favored. Infection at night is vital for quality. The difference between day and night temperatures should be big enough and the night temperatures low enough to raise carnations of high quality. High night and day temperatures, especially during flowering, contributes to abnormal blossom opening and calyx splitting. Whereas at complete growth phase it must be 60 to 65 percent. Greenhouse for commercial carnation cultivation Criteria for selecting Greenhouse project site: To protect the plants in the rain at the monsoons, without impacting the atmosphere Circulation side drapes should be stored openly at slanting position To control light intensity white color shaded net 50 percent is utilized. Roughly 50, lux light intensity is called for on the plant level. Employ whitewash to east, west and west sides of the greenhouse to shield plants from glowing light intensity through the summer season. Support Method Great support substance is vital for the achievement of this farming. This will cause bent stalks and stagnation of this harvest growth. For support, the material is the metal cable, or plastic rope is used. To make the more favorable growing condition for carnation organic matter FYM is added in bed with the basal dose of NPK fertilizer. Carnation cultivation Checks the EC and pH of the soil after use of basal dose and before the plantation. Shallow planting is vital in tropical places. Place the netting on the beds prior to planting. Ideal requirements for planting- hot, humid and a quite bright climate. Important tips for reducing mortality in Carnation Fumigation process is absolutely vital to stop the intrusion of soil-borne diseases. The added FYM in bed must be entirely decomposed. Practice just surface watering and prevent splashing water on foliage. If overhead irrigation is essential, do it early in the morning if plants will dry fast. Never shut the side curtains in day Adhere to the day program which basically contains preventative fungicides and insecticides, along with the compounds that improve the main growth and establishment of this plant. Carry out pinching after two weeks on the 5th foliage set. After planting, the pinching has been developing a major stem. This permits the side shoots to grow. These shoots make the initial flush. The ideal time for pinching is in the morning because the head of carnation plant easily breaks The pinching process starts three months after planting. Raising net too early which makes difficult to choose crop. Raising too late enables the harvest to fall to one side. Drippers should be put at a distance of 30 cm with 2 Iph discharge for sufficient supply. Fertigation Create a soil analysis prior to planting. Weeks provide only water no fertilizers because of carnation plant root not able to consume any nutrition.

Chapter 7 : Effects of Chemical Fertilizers - Sustainable Baby Steps

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