CHAPTER

7

FERTIGATION IN FRUIT CROPS

OBJECTIVES

After studying this chapter, you will be able to:

- Understand fertigation, its uses and advantages

INTRODUCTION

In the recent years, there has been significant improvement in fruit production technologies. Of several such technologies, development of fertigation has forced us to think and talk about this technology as its use has tremendous effect on yield and quality production with significant reduction in water use. You might have heard about this technology, if not, we will discuss about its uses, and advantages in this chapter .

What is fertigation?

Fertigation is defined as the application of fertilizer or chemicals through the drip irrigation system. It is a controlled system to supply soluble plant nutrients at the root zone of the irrigated crops. Fertigation is done through tank, ventury or pump systems. The most practical method of applying of fertilizers through the irrigation system is by creating a 10% bypass flow of the main line flow, through an artificial fertilizer mixing tank.

Advantages of fertigation

Some of the advantages of fertigation are as under:

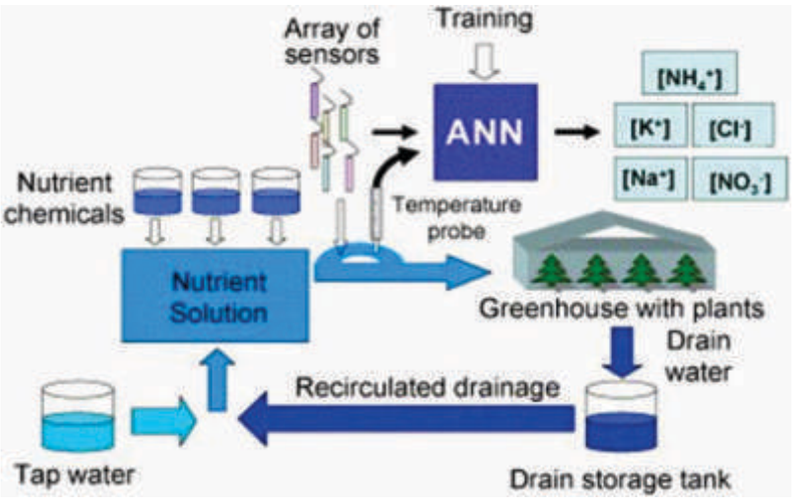
- Fertilizer use is optimum without fluctuation.
- Loss of fertilizer due to leaching is minimum.
- Nutrients can be applied any time during the growing season based on crop need.
- Mobile nutrients such as nitrogen can be carefully regulated in the soil profile by the amount of water applied so that they are available for rapid use by the crop.
- Fertilizer use efficiency is very high.
- There is saving of fertilizers by about 40-60%.
- Some tillage operations may be eliminated, especially if fertilization coincides with the application of herbicides or insecticides.
- There is significant increase in crop yields .
- There is no pollution of water source.
- Significant saving of energy and labour .
- Natural resources are efficiently utilized.

- Groundwater contamination is less likely with fertigation because less fertilizer is applied at any given time.
- Application of fertilizers through drip can correspond to maximum crop needs.

There are several advantages of fertigation but it has not picked up in all parts of the country. The major constraints coming in the way are:

- Liquid fertilizers are not available at reasonable rates.
- Initial cost of establishment is very high
- There is lack of research and development efforts in developing fertilizers suitable for fertigation.
- Policy environment for promoting the growth in the sector is inadequate.

Presently, water soluble fertilizers suitable for fertigation are not being manufactured in India. Hence, some of the available normal fertilizers are being used with some modifications. Besides, some formulations are being imported which are expensive. The solid fertilizers which supply nitrogen (N) are (a) Anhydrous ammonia, which increases pH leading to precipitation with calcium and magnesium and results in clogging of the drip system, (b) Calcium nitrate is relatively soluble and does not cause much pH shift.



Pictorial view of fertigation

Tanks of fertigation system containing nutrient solutions

In general, application of phosphorus fertilizers through the drip irrigation system is not recommended, because (1) basal application of phosphorus satisfies the plants requirement in most of the cases, (2) phosphorus is limited in its movement and has high rate of fixation in the soil (3) most of the applied phosphorus creates chemical and physical precipitation leading to clogging problems. Glycerophosphate and inorganic phosphorus are the other sources of phosphorus used in fertigation. Liquid fertilizers are solution containing one or more plant nutrients. These can also be supplemented with micronutrients. The raw materials used in liquid fertilizer production are mainly bulk fertilizers such as ammonium sulphate, ammonium nitrate, urea, ammonium phosphate, phosphoric acid, potassium nitrate, potassium chloride, potassium sulphate etc. The liquid fertilizers are pure and do not precipitate. Normally, the liquid fertilizers are acidic (pH 5.5-6.5) and help in correcting the soil pH to some extent and also help in preventing clogging of emitters. However, for acidic soils, liquid fertilizers with neutral pH or even higher pH could be used. These liquid fertilizers are available as chloride free

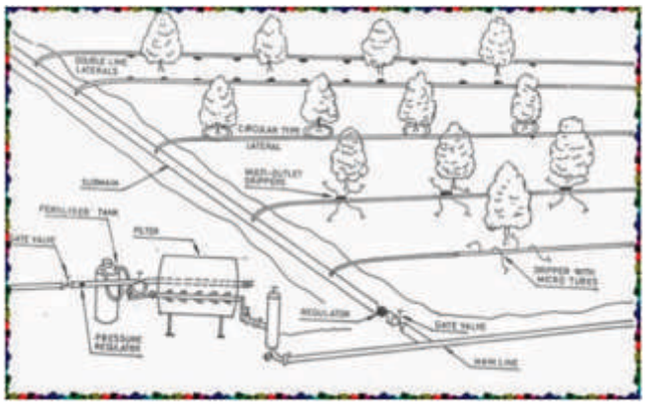
normal fertilizers. Certain fertilizers like aqueous ammonia, calcium nitrate, potassium sulphate, zinc nitrate and ferric sulphate are not suitable for fertigation.

Disadvantages of fertigation

Although, fertigation is highly advantageous. However, it is felt that it may have the following diasvantages as well:

- Initial establishment costs are very high, which is beyond the reach of common farmer.
- Salts, which are common in irrigation water precipitates and can form inside of irrigation pipelines and clog nozzles.
- Some fertilizers such as ammonia, various polyphosphates and iron carriers can react with soluble calcium, magnesium and sulfate salts to form precipitates.
- Many fertilizer solutions are corrosive.

A view of fertigation in banana



Pictorial view of drip irrigation

ACTIVITIES/EXERCISES

- Visit some fruit orchard in which drip and fertigation facility is installed. Note different components and their functions.

CHECK YOU PROGRESS

1) What is fertigation? Write its advantages.
2) Inspite of several benefits of fertigation, why fertigation technology could be become popular in India.
3) Why phosphatic fertilizers should not be applied through drip irrigation system?

WRITE TRUE (T) OF FALSE (F) FOR THE FOLLOWING STATEMENTS

I) Liquid fertilizers are used in fertigation.

ii) Liquid fertilizers are produced in plenty in India.

iii) Phosphorus is highly mobile in soil.

iv) Liquid nitrogen is frequently used in fertigation

v) Clogging of lateral in fertigation is quite common problem.

SUGGESTED FURTHER READINGS

- Bose, T.K., Mitra, S.K. and Sanyal, D. (2001). Fruits: Tropical and Subtropical (Vol. 1). Naya Udyog, Kolkata-6.
- Bal, J.S. (2007). Fruit growing. Kalyani Publishers, Ludhiana, India.
- Chattopadhyay, T.K. (2008) A textbook on Pomology, Vol. 3 (Tropical fruits), Kalyani publishers, Ludhiana, India.
- Sharma, R.R. (2006). Fruit Production: Problems and solutions. Intl. Book Distributing Co., Lucknow, India.

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