

NUTRIENT INJECTOR 1/

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Abstract.--The nutrient injector is designed to inject predetermined amounts of nutrient into the irrigation system being used. The results with this injector have been exceptional, both in greenhouse and lathhouse. It is also used for insect and fungicide control.

The increasing demand for container grown seedlings made it necessary for the Colorado State Forest Service to investigate new methods of production of container grown seedlings. This nursery has been growing container seedlings for some thirteen years, and as in most cases, started out quite primitive, first; hand operation, then mechanized and now still using the machines, we are moving into greenhouse production.

This increased demand for nursery products along with the increasing labor costs and decreasing availability of equipment with delivery dates extending sometimes to Years, made it necessary for this nursery to design and construct an injector (fig. 1) suited to our needs. These needs are somewhat varied from retail nursery production, for example: normal retail greenhouse plants can use successfully only one concentrated nutrient formula or solution. We were faced with three solutions that could not be mixed in concentrated form. We were unable to locate a manufacturer of an injector that would handle more than two solutions at one time.

In May 1973, the greenhouse we have now was in need of an injector to handle our needs. We could not wait ten months to a year for delivery of a unit that would not be satisfactory even when received, this unit would handle two solutions and had an estimated cost of \$1600.00. It would not be completely portable and undoubtedly parts would take excessive delivery time.

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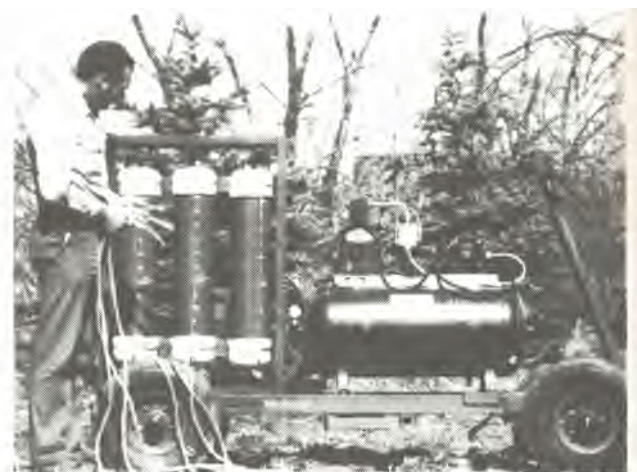


Figure 1.--Machine used to inject nutrients into nursery irrigation system.

It was then that the present injector was designed and constructed here in our shop.

The basic injector is capable of containing nutrient solutions in the injector itself. These solutions are contained in three three-gallon tanks made of 260 PSI tested P.V.C. It can accommodate from one to ten and possibly even twenty tanks or solutions.

The unit now being used is capable of fertilizing approximately 32,000 square feet of floor or bed space without refilling the tanks.

The injector does not use mechanical water operated pumps nor motor driven pumps. It operates on air pressure in the tanks which can be supplied by a small portable air compressor. Presently our unit is mounted on a small hand trailer. It is moved from green-

house to lathhouse or any irrigation system where nutrient, pesticide or fungicide is needed. It is also used in the nursery as an air supply where compressed air is used such as tire repairs, cleaning parts and operating air operated equipment.

The unit is exceptionally simple in design and is easily operated. There are no metal parts that come in contact with the corrosive elements of the solutions and it is cleaned after use, if desired, with a garden hose.

This unit is calibrated in either of two methods, a) air pressure is regulated to overcome water pressure in the irrigation line, and b) solutions are metered through micrometer valves. Both methods are accurate and can be visually watched by means of sight tubes on each tank of nutrient.

Limits of calibration are from 1:10 to 1:10,000, with irrigation water pressure from less than 5 P.S.I. to 150 P.S.I. This is a distinct advantage over conventional injectors as they will not operate well at a very low water pressure and most are calibrated with a ratio of 1:200 and cannot be adjusted.

All parts on this unit are readily available from plastic pipe supply dealers or even hardware stores. If one valve or tank is damaged, none of the remaining tanks are affected and can be used with no problems.

Any irrigation main line or branch line will accept this unit without exception that I have found.

The principle of this unit could be applied very easily to large tank trucks for fire retardant, insect control on large trees, underground injection of nutrient and systemic solutions, and aerial applications of any liquid.

As with any injector, the advantages of applying nutrient directly into the irrigation water are that it is much easier and is more effective than top dressing with granular nutrients.

Colorado State University has applied for a patent through the Vice President for Research.

Question: Is there a back-flow check valve on your main irrigation line?

Snedigar: No, not on this model.

Question: How do you tell the ratio of fertilizer solution to water you are obtaining?

Snedigar: I measure the gallons per minute of irrigation water applied to the crop, calculate the flow of stock solution by timing the fall of liquid level in the sight tube, and divide.