

SUGGESTIONS FOR THE EARLY LETTUCE CROP

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Early Plowing a Good Farm Practice—Aeration of the Soil a Necessity for Obtaining a Proper Stand—New Irrigation Practices Discussed

COMMON sense commands a premium in lettuce growing as well as in the production of most crops. Too often the simple physiology of the plant is overlooked when due regard to the proper preparation of the soil and the welfare of the young plants would net a handsome profit. During the season of 1926 losses resulted in some of our lettuce districts which were directly attributable to avoidable conditions resulting from faulty methods used in the preparation of the soil and the handling of the young stand.

In preparing the soil for lettuce some growers plow under alfalfa and other green crops. Now there are several fungi commonly found in the soil which feed upon decaying vegetation. These organisms together with bacteria, lacking chlorophyll, cannot make their own carbohydrate food from carbon dioxide and water, therefore they break up the crop plowed under and obtain nourishment from that source. Most of these organisms are beneficial for they liberate compounds from the raw plant material in the soil which the roots of lettuce otherwise could not obtain. However, a few species of fungi which live chiefly upon decaying organic matter have acquired the ability of reaching over to partly decayed plants and finally of attacking living plants. The plowing under of crops like alfalfa appears to increase their growth and population, so that they are found in great numbers upon the roots of lettuce.

Species of the fungus, *Rhizopus*, have been found capable of transferring their activities from decaying organic matter in the soil to the roots of lettuce and later to the short stems of the lettuce seedlings. In one field most of the seedlings examined showed filaments of *Rhizopus* growing around the roots and some plants not more than an inch in height already had brown lesions or "sores" on the stem in the region near the soil. In this field the crop which had been plowed under was alfalfa. Had the plowing been completed early enough, the decaying of the alfalfa would have been in a much more ad-

vanced stage by the time that the sowing of the lettuce commenced; the *Rhizopus* fungus would have been less active and the damage correspondingly small. Early plowing in order to permit thorough rotting of the green manure crop is good farm practice.

Another condition detrimental to lettuce is poor aeration of the soil. Lettuce plants like all crop plants, require a ventilated soil about the roots. Accumulation of carbon dioxide in the soil is very injurious. Thus Noyes, Trost and Yoder found that when 650 cubic centimeters of carbon dioxide per hour were introduced into the soil about the roots of lettuce grown in Wagner pots, normal root development ceased. Not only is carbon dioxide added to the soil by the breathing of the roots of lettuce, but it also accumulates as a result of the decay of organic matter in the soil. Cultivation mixes oxygen with the soil and air is also carried down into the soil by the downward movement of irrigation water and rain. When water stands on the soil and fills the air spaces, carbon dioxide accumulates in the form of carbonic acid, breathing becomes difficult for the roots of the growing crop, the growth ceases, and finally the living cells of the roots become asphyxiated and killed. At high temperatures the process of asphyxiation is most rapid for then carbon dioxide accumulates rapidly.

Last season the weather was very hot at the time lettuce planting began in September. In order to keep the seedbed cool some growers applied irrigation water constantly for a long period—as long as 70 hours in some cases. As a cooling method this practice was unsound. Not one of these growers would think of keeping a constant stream of warm water flowing over an olla for the purpose of cooling drinking water. Instead, he would depend upon the evaporation of water from the moist surface of the olla for cooling the contents. The same principle applies to the soil, Thorough wetting followed by the withdrawal of the irrigation water

greatly increases the surface for evaporation as compared with that available when water stands on the soil. In the former case every wet particle of soil in the surface layer multiplies the evaporating surface; in the second the evaporating surface is practically that of a free water surface. Worse still, the water fills the air spaces of the soil and strangles the crop. Several fields which showed a good stand of lettuce for a few hours, had the root system affected to such a degree that the entire crop was lost.

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A good whitewash for poultry houses is made by slaking 10 pounds of quicklime in two gallons of water, covering it with a cloth and allowing it to slake for one hour. Water is added to bring it to the right consistency.

A weather-proof whitewash is made by slaking a bushel of quicklime in 12 gallons of hot water, to which is added a solution of two pounds of common salt and one pound of sulphate of zinc dissolved in two gallons of boiling water. This is thoroughly mixed with 2 gallons of skimmilk.

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