

has been dug it is possible that a shallow-rooting crop may benefit considerably from the improvement in soil conditions created by deep root penetration of the previous crop. Early and late-maturing vegetable varieties can be followed by crops which occupy the ground much longer.

The advantages of crop rotation are summarised as follows by H. C. Thompson: "Many serious diseases can be controlled in a practical way by systematic rotation. Club root of cabbages and other crucifers can be controlled by keeping the land free from cruciferous crops and weeds for two years. Potato scab and onion smut cannot be controlled by ordinary rotation, since the organisms involved live in the soil for several years. In planning a system for insect control one should follow a crop by one known not to be attacked by the same insect."

### SHELTER

Throughout the Dominion many new home gardens are being established for which adequate shelter should be considered as primarily necessary for profitable vegetable production. The devastating effects of high prevailing winds on vegetables are often observed, and success in vegetable growing cannot be achieved where crops have no protection against root disturbance. Labour, land, seeds, manures, and fertilisers are lost in efforts to produce high-quality vegetables under adverse weather conditions.

Vegetables should not, however, be treated like glasshouse plants. A reasonable amount of exposure is beneficial, but no vegetable can produce its best if its feeding roots near the surface are disturbed and broken by the swaying motion of its top growth caused by lack of protection from high winds.

Tall-growing varieties such as broccoli, cauliflowers, kale, Brussels sprouts, climbing beans, and tomatoes are likely to suffer most unless adequate shelter is provided. No matter how these vegetables are staked and fastened or moulded up with soil, proper development and full maturity will be prevented by continuous exposure to high winds.

### IMPORTANCE OF WATER IN SUCCESSFUL VEGETABLE PRODUCTION

The following approximate percentages of water content of vegetables usually grown in the home garden show the importance of sufficient water being available to the plants:—

Vegetable.	Percentage of Water.	Vegetable.	Percentage of Water.
Asparagus ..	93	Leeks ..	88
Beans ..	88	Lettuce ..	94
Beets ..	87	Onions ..	87
Cabbage ..	92	Pumpkins ..	90
Carrots ..	88	Squash ..	90
Cauliflowers ..	91	Tomatoes ..	94

Watering the garden will be done more intelligently if the functions of

water in plant life are better understood and the high water content of vegetables is realised.

Water is the solvent of plant food in the soil, and by and through the roots plants obtain the nutrients necessary for growth and development. Inside the plant water is the medium of distribution to plant tissues of foods elaborated by the plant itself. Surplus water is transpired by the plant through the leaves, and it is reliably estimated that about 300lb. of water is transpired for every pound of solid matter developed by the plant. Water is therefore necessary for all the physical changes of plants.

Competent authorities have stated that one inch of water is necessary every seven to ten days for successful vegetable growing, and that during specially-dry periods more may be required. The need for a plentiful water supply for the garden should therefore be evident.

On areas of land covered by glasshouses in which tomatoes are grown and unaffected by the usual heavy winter rainfall it is often advisable to apply over 27,000 gallons of water an acre three times between crops. This means the application during winter of over 300 tons of water an acre on land not exposed to atmospheric conditions.

All parts of plants do not contain the same proportion of water; roots usually hold the greatest percentage. This, however, does not imply that plant roots should be submerged in water. Applications of large quantities will depend on drainage efficiency. Few vegetables will remain healthy when their roots are over-supplied with water.

Surplus water taken in by plants is evaporated from the leaves, this process being termed transpiration, and experiments have demonstrated that from a square foot of the surface of a sunflower leaf there will pass into the air about four ounces of water in 24 hours. This means that in 100 growing days a sunflower plant will transpire 25lb. of water a square foot of leaf surface. At the estimated rate of transpiration of a healthy 30-year-old apple tree an acre of 40 trees would transpire 600 tons of water a year. Figures published in the October, 1946, issue of the "Journal" showed the quantity of water required for the growth of one cabbage, and when a full assessment is made of the quantity of water necessary for vegetable growing in the home garden the important part it plays will be better understood.

Though water in abundance is necessary for vegetable plant growth, it should not be applied at any time. The early part of the day is always considered best for watering plants. Water applied on dull days and in the

absence of sunshine may cause plants to be attacked by injurious fungi.

Soil condition also plays an important part in the quantity of water which may be used. Where organic matter is plentiful the soil will be more retentive of water and less will be necessary. Soil in this condition will not be subject to loss of nitrogen through leaching to the same extent as light soils low in organic matter content.

**When undecayed stable manure or matured green manure crops are dug under during late spring or summer, moist soil conditions are essential for decomposition, and heavy watering will be necessary.**

### THE IDEAL SOIL

"We may define the ideal soil as one in which plants of many different kinds flourish and grow prosperously. Such a soil will be reasonably deep; it will be rich in all the needful nutrients; it will retain moisture sufficient for the plants' needs through times of drought; it will be warm; its physical structure will be such as to encourage root development; and it will be easy to cultivate. Such is the ideal towards which we have to strive. Here we have the constituents of a fertile soil. All that is left for us to do is to discover how far our soil conforms to the ideal, and what we can do to remedy its faults. Sometimes it is relatively easy to come somewhere near it—we can never quite reach it; sometimes it is a long, laborious task which calls for all the patience and skill we can command."—R. B. Falconer, "Gardeners' Chronicle," 12.1.46.

This statement by an outstanding British authority indicates what the ideal soil should be, but home gardeners must make the best of the land available. By skilful operations and proper methods of cultivation the worst soils can be substantially improved, and incorporation of organic matter in all types of soil is invariably the dominant factor which brings about the desirable condition of fertility and good tilth.

In the agricultural sense "the soil" is just the top few inches of the earth's crust, and upon it all life depends for its existence. Today a great responsibility rests upon the man who has the privilege of cultivating only a small portion of it. An understanding of appropriate cultural practices necessary for successful vegetable growing will lighten the labour inseparable from cultivation of the soil, provide useful employment for spare time in the garden, ensure adequate compensation for labour expended, and improve the health of those who consume the vegetables.