

Investigations have shown that certain weeds and crops give off injurious substances. Bad results are seen, especially where there is an attempt to grow the same crop year after year on a piece of ground. Again, the cure here is obvious. Rotation of crops possibly renders its greatest help in this respect.

The last stumbling block to the progress of root development is in judicious cultivation. This applies only to such crops as are cultivated in their growing season. Many a corn and potato crop has been cut down 20% to 40% in yield by continuous and deep cultivation, close to the growing crop. When one realizes that the roots are the carriers of soil waters, containing plantfood, the injurious nature of deep cultivation is clear. Numerous experiments show that best practical results are obtained by confining deep cultivation to the early part of the season and keeping further and further away from the growing crop as the season advances.

With the foregoing hindrances to the rooting of farm crops evidence clearly points to the necessity of greater attention to root room. Investigations have shown that many an orchard crop is reduced by attempting to grow a heavy coating of grass at the same time that the trees are supposed to produce fruit. The grass roots crowd the thread-like roots of the growing trees, with the results that the crops compromise in an inferior yield of both fruit and grass. If care has been taken to control soil-moisture, however, the compromise as to yields is determined by the ability of the growing crops to send their roots afield sufficiently far to lay hold of the plantfood which the soil contains.

Now certain practices have been found to greatly increase the crop's

ability to produce roots. For instance, the use of fertilizers high in phosphoric acid are reported by all soil investigators to have a distinctly favorable effect in strengthening root production. This strengthening of roots is exceedingly important in fall-sown grain since if the root system has been well developed, winter killing of the crop is less likely. If, on the other hand, the crop has not been fertilized in the autumn, and its root system is not strongly and fully developed, a great deal of help can be rendered by spring top-dressing, either with manure or fertilizers, which give available plantfood for the hungry wheat crop as soon as warm weather starts plant growth.

Another contributing factor is the nature of the growing season. As a rule growth is at its height toward the end of June. Early in July the sun's rays become so hot that they dry up much of the soil moisture. Now if by the use of strong seed and proper balance of plantfood strength can be given to growing crops so that they send out their rootlets early in the season and make a strong start, they will have accumulated more of the essentials to crop maturity before the climatic conditions of early summer interfere so seriously with their progress. Moreover, the usual feeding of roots will have given them strength to dive deeper and farther into soil areas so that they will have laid hold upon the stores of food which to weaker crops would be unattainable.

Then, the very best interests of the crop are served by providing a well-stored mellow soil where crop roots can freely stretch out as the growing season advances and by providing an abundance of suitable plantfood so that a strong and vigorous root-growth can be made. This means largest yields of best quality.