

and efficient roguing of diseased plants up to a fairly late stage.

Closer planting is often practised to minimise the reduction in the total number of runners from a given area resulting from roguing out of diseased plants, but is not recommended. Plants growing too closely together produce such a tangled mass of runners that they cannot be rogued efficiently.

Culture

Cultivation after planting, although frequent, is shallow and is aimed at securing good weed control until the developing runners cause it to become impracticable.

Flowers are picked off as they appear later in spring so that fruiting is suppressed and the energy of the plant is concentrated on runner production. Some growers hesitate to adopt this practice in the belief that virus diseases may be spread from plant to plant by contaminated hands, but strawberry virus diseases cannot be spread in this manner, the strawberry aphid (*Pentatrichopus fragariae*) being the only vector.

On the cessation of cultivation the beds are left, except for any necessary roguing, until digging begins. The reason for keeping off the beds at this period is that unnecessary compacting of the surface soil is avoided and thus good rooting conditions for the plants are maintained.

Manure is seldom used in the propagating beds, the hardy plants produced without fertiliser normally making good growth when planted into fruiting beds. However, when there is an obvious lack of one of the main elements, a light dressing of the required fertiliser should be applied.

Digging and Packing

Digging begins during May, plants being lifted and forwarded as required to fruit and produce organisations who supply growers or, sometimes, direct to growers.

The forwarding of plants as required, so that rate of digging does not exceed rate of planting, enables growers to receive plants in a relatively fresh condition. Digging on the larger nursery beds is usually carried out by contract Maori labour, the digger loosening the plants with a fork and keeping just ahead of the picker. The latter pulls, places, and ties the plants in bundles of 50, having first discarded the mother and any unthrifty plants. Immediately following is the packer, who puts the bundles in sacks or boxes. Plants awaiting dispatch are placed in the shade, usually beneath a hedge or tree, though a tent is sometimes used if there are no trees handy.

Pests and Diseases

Strawberry growers are dependent on the plant growers for disease-free plants, which are essential for successful berry production, and all nurseries are registered and inspected by officers of the Department of Agriculture. Unlike England, New Zealand has no plant certification scheme for strawberries.

Strawberry plants are subject to attack by a number of pests and diseases and nursery beds are isolated from the main growing areas in an

attempt to avoid disease infection. Despite this, most beds require attention to control pests and diseases during the year. Descriptions of the major diseases affecting nursery beds and of control measures follow.

Virus Diseases

Virus diseases, which cause degeneration, are transmitted by only one species of aphid (*Pentatrichopus fragariae*) and are usually introduced into strawberry gardens by the planting of infected runners. They are the most serious diseases affecting strawberries in New Zealand and other countries and probably have been the prime factor in the reduction of areas and yields in this country in the past.

Two strains of virus are peculiar to the strawberry, yellow edge and crinkle.

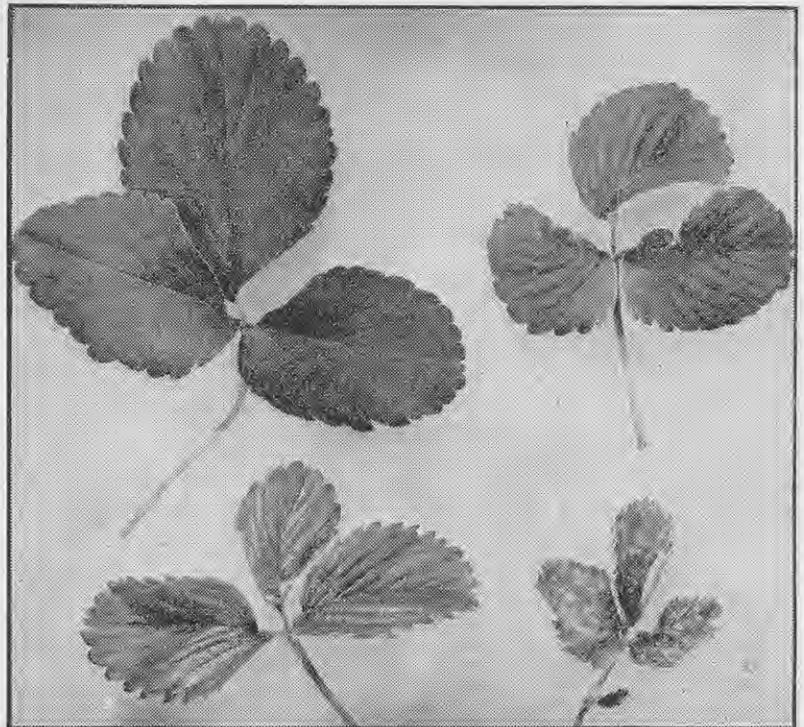
Yellow edge: This causes a general dwarfing of the youngest leaves and a shortening of the petioles, together with a yellowing of the leaflets, which is more pronounced at the edges. The plant appears flattened, compared with

a healthy one, owing to the dwarfing of the petioles of the leaves nearest the centre of the plant.

Crinkle: This may be as prevalent as yellow edge in some districts. The symptoms consist of a crinkling of the young leaves accompanied by yellow (chlorotic) spots, with or without



Plant infected with the virus disease strawberry yellow edge as compared with leaf of healthy plants.



Healthy strawberry leaf (upper left) and leaves showing distortion, crinkling, and spotting caused by the crinkle virus.