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PLANT PARASITES.

Summary of Dr. Cone's Lecture 23:10:41

A parasite is literally one that eats at another's table. A plant parasite takes its food from another organism, plant or animal, and incidentally to some extent damages its host.

Parasites may be classified according to their means of getting food; complete parasites have neither roots nor green leaves while partial parasites usually have functional leaves but depend on the host for what other plants usually take in through their roots. It is sometimes hard to draw the line between partial parasitism and symbiosis where there is an exchange of materials between two plants to their mutual benefit.

The complete parasites were illustrated by various fungi recognised chiefly by the damage they do. Leaf spots and grass rusts are easily passed over but when we saw ugly deformed flowers of Clematis we were interested to hear that this is the result of a parasitic rust fungus that stimulates its host to produce gall tissue in much the same way as growth promoting substances (phytohormones) encourage cuttings to form roots. Bracket fungi, common on forest trees are responsible for rot in the wood. One timber specimen displayed was stained bright green by a parasitic fungus pervading its substance.

Amongst flowering plants complete parasites are not common but New Zealand has a striking example in Dactylanthus Taylori, that grows on the woody roots of trees causing them to grow into the form of "wooden roses" that are displayed by scraping off all the Dactylanthus. The Lathraea first recorded in New Zealand in this Bulletin is another complete root parasite. The orchids of the genus Gastrodia sometimes erroneously said to be root parasites, depend for their livelihood on the fungi that inhabit their swollen tubers.

Dodder, like a tangle of whitish threads amongst clover plants, and Cassytha whose yellowish stringy stems infest scrub in the far North are alike in tapping the food supplies in the stems of their hosts by means of sucker-like organs.

Partial parasites best known to us are the mistletoes whose flowers are amongst the gayest in our flora. Foresters dislike them for the damage they do to their hosts, destroying branches through their sheer weight. In Loranthus micranthus common about Wellington, we can find examples of self and compound parasitism and specimens of Korthalsella lindsayi, from the lower Wainui-o-mata Valley showed little plants growing on what might have been their own parents. K. salicornioides, that we saw in such quantities on Mr. Field's property at Waikanae sometimes kills the manuka branches on which it grows. Notheia anomala, a brown alga parasitic on Hormosira, the necklace seaweed, probably belongs in this group.

Partial parasites attached to roots are not always easily recognised. Euphrasias in Europe are definately root parasites but there is no proof that N.Z. species behave in this way. Dissecting out the root systems to clear up this point is a job that must be undertaken some day.

Many plants not ordinarily regarded as parasites are still not quite independent of other plants for their food supply. Legumes digest and use the bodies of bacteria that grow in their root nodules. This source of food is so essential to them that they will not thrive unless the appropriate nodule-forming bacteria are in the soil - hence the necessity of innoculation with such crops as lucerne.

In certain plant families the roots contain a fungus which grows partly in the soil and partly inside the root cells where it stores up food material which is later digested by the roots. This combination, known as mycorhiza or 'fungus rooted', occurs fairly commonly e.g. in all pine trees, where the mycorhiza fungus may often be seen forming fructifications, toadstools, above ground under the trees. The prothallus or underground stage of Lycopodium is mycorhyzic, depending entirely on its fungus. In orchids the fungus infects not only the roots but the whole plant, even the seed, so that the seedling is associated from the first with its vitally necessary partner. Heaths and epacrids are mycorhiza plants and many others that are hard to transplant, like the gentians, may have difficulty is establishing in a new home because the fungus they need is not provided for them.

The perfect partnership seems to have been achieved in lichens, each of which is a compound of two distinct plants, one an alga, one a fungus. Lichens have been artificially synthesized by bringing the proper two organisms together. So successful is the symbiosis that the dual organism, the lichen, can live where neither constituent could live alone.

This last point was emphasised by Dr. Oliver's reference to the collections of the Byrd Expedition in Queen Marie Land where the majority of the plants found were lichens, some eighty species in all.

PAKURATAHI FORKS.

The Society was fortunate in having a glorious day for the trip to Pakuratahi Forks on November 1st. Beyond the turnoff from the main road, north of Kaitoke, Nothofagus truncata in flower, Olea cunninghamii, and Plagianthus betulinus in bloom were the first things to attract our attention.

Over the river we entered fine beech forest, where some lovely clumps of Clematis gleamed in patches of sunlight.

Beyond this was rimu forest, with rata next in abundance. Some of the rata trees bore evidence of having started life high up above the ground and some still held a dead rimu in their grasp. Others of the tall forest trees were rewarewa, totara, tawa, kamahi, and hinau.