could be functionally influenced by a magnetic field. Smith and Cook[5] have reported on the effect of magnetic field on trypsin activity. The formation of radicals is a common step in organic reactions. It is possible that a magnetic field could promote the loss or gain of protons and/or other reactive groups from compounds in the respiratory cycle.

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Oil Spot Disease in Tea

Mulder and Shanmuganathan[1] first reported in 1959 a disease of tea referred to as 'oil-spot of tea leaves'; but they failed to ascribe any definite cause for it. From further investigations carried out here, we have now obtained evidence that the causal organism of this disease is a fungus.

The cause of the disease has for a long time remained obscure as all efforts to isolate a pathogen from the diseased shoots have proved unsuccessful, and attempts to transmit the disease by grafting and sap inoculations have also failed. A fungus has now been identified as the cause of this complex of symptoms. This organism is a weak parasite which remains for the most part in the basal portions of the tea bush, being confined mainly to the wood of the frame. When the main branch below the diseased part of a bush is cut a sector of the wood often appears discoloured, and it has been possible to isolate the pathogen from this area. The same fungus has been isolated from diseased bushes collected from several estates, and experiments indicate that it produces a toxin which acts at a distance from the site of infection, and gradually destroys the entire plant.

The fungus was grown on a modified Czapek–Dox medium containing 10–15 per cent dextrose or sucrose for 3 weeks at room temperatrue (23° C). At the end of this period, it had formed a thick mat, and the liquid was removed by filtration and rooted cuttings of tea (clone *TRI* 2049) were placed in the filtrate. Characteristic oil-spots and necrosis of the veins, typical of the disease, occurred after 4 days (Fig. 1). Cuttings placed in the original pure liquid culture remained free from symptoms. Young bean plants produced water-soaked spots on the leaves and browning of the vascular tissues when placed in the same culture filtrate, and excised tomato shoots showed rapid wilting followed by necrosis of the leaves.

Fig. 1. Left, healthy tea leaf; right, leaf of rooted cutting which was placed in culture liquid for 5 days

Attempts were also made to extract the toxin from diseased plant material. Diseased wood was comminuted thoroughly, extracted with distilled water, and rooted cuttings were placed in the filtrate. Typical oil-spots appeared after 4–5 days; extracts from healthy wood were non-toxic.

The lesions produced by the culture filtrates are so characteristic that there can be little doubt that the toxin produced by the fungus in the host plant is the same substance as that found in the culture filtrates.

The fungus has so far remained sterile on several media, and has thus defied all attempts to identify it.

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Stimulation by Citric Acid of Germination of Eastern Red Cedar (*Juniperis virginiana* L.)

I have found that pretreatment with citric acid increases both speed and total germination of eastern red cedar seed. Earlier, exploratory investigations showed that the acid also increased both speed and total germination of bald cypress seed (*Taxodium distichum* (L.) Rich) and I have reported similar effects of pretreatment of eastern white pine seed (*Pinus strobus* L.) with both citric and tartaric acids[1]. Of the several species examined, eastern red cedar showed the most striking response to pretreatment with citric acid.

A fresh lot of eastern red cedar cones was soaked in water and all pulpy material removed by hand using screens and sedimentation. The cleaned seeds were allowed to dry in air for 3 days at room temperature and then given one treatment in a factorially designed study involving 6 chemical treatments, 5 soaking periods, 4 stratification periods, and 2 stratification temperatures.

Three 100-seed samples were drawn from each treatment combination and germinated on a sand–vermiculite medium in the dark at a constant temperature of 14° C. Germination percentage was expressed as that of full seed (about 90 per cent for this work) and were tallied when the radical penetrated the medium and lifted the seed coat completely. I was primarily concerned with germination percentages occurring within 30 days because maximum germination with maximum speed is desirable.

Fig. 1 shows results for some of the better treatments. When seeds were soaked for 4 days in a 10,000 p.p.m. solution of citric acid, prior to 90-day stratification, there was 93 per cent germination at 30 days. A 4-day soak in water with 90-day stratification gave 73 per cent germination and stratification alone gave only 23 per cent germination. For the 90-day stratification period, seed soaked in citric acid and in water showed an increase in 30-day germination of 304 per cent and 217 per cent, respectively, over no soaking. Seed receiving no treatments did not begin germination until 70 days and reached only 43 per cent at 120 days.

The main factor in inhibition of germination in eastern red cedar is embryo dormancy[2–4]. Its embryos exhibit both primary and secondary dormancy[2,4]; but because these were fresh seed, secondary dormancy may not be a factor. Whether citric acid creates the same response with secondary dormancy has not been determined.

The nature of the embryo dormancy of this species, then, remains the important question. It is known that water will sometimes remove inhibitors from seed. The seed coats of eastern red cedar are impermeable to water, but