



Fig. 2. Nodulation of a molybdenum-deficient alder plant showing many very small nodules uniformly scattered over the entire root system

much higher than in normal plants. Moreover, the same pattern of nodulation has been found in legumes inoculated with ineffective strains of *Rhizobium*.

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### Œstrogen Content of Plants as a Function of Conditions of Culture

IN the course of a broad investigation on the hormone content of plants, one of us<sup>1</sup>, referring to the work of Alexander<sup>2</sup>, stressed the important influence that conditions of culture could exert on the amount present in plants of substances having a hormonal action. Preliminary results of our investigation point to a definite influence in this respect.

Carrots cultivated over a period of several years on plots of soil that were left free from fertilizer and farm manure, or were treated either with a mixture of nitrogen, phosphorus and potassium, or with farm manure, were gathered and dried in the air at approximately 60° C., and tested for their œstrogen content, using immature female mice weighing 12–15 gm. The technique used was that described by Simon<sup>3</sup>. It is based on that used by Evans *et al.*<sup>4</sup>, with the difference that both the carrot extract, and the diethylstilbœstrol used for the comparison, were given mixed in the diet. The diet was made up as follows: dextrine, 20; linseed meal, 13; barley, 10; wheat, 22; oats, 15; fish meal, 1.5; meat meal, 1.5; yeast, 0.5; mineral mixture, 2; gelatin, 2; dried milk, 12.5.

The food was prepared in the form of a biscuit of 0.5 cm. width.

The mice, divided into groups of six, were fed this diet during a 72-hr. period. They were then killed after 8-hr. fasting. The ovaries, Fallopian tubes and uteri were dissected out up to the cervixes, stripped of all extraneous tissues, and weighed.

The findings are recorded in Table 1; they are given in equivalents of the doses of diethylstilbœstrol which served for comparative measurements in the control groups.

Table 1. CONTENT, IN EQUIVALENT OF DIETHYLSTILBŒSTROL, OF CARROTS GROWING ON SOIL CONTAINING VARIOUS FERTILIZERS

Type of fertilizer	Content in equivalent of diethylstilbœstrol (γ/100)	
	Fresh product	Dry product
Control with no fertilizer	0.12–0.16	0.6–0.8
With nitrogen, phosphorus and potassium mixture	0.24–0.26	1.2–1.3
With farm manure	0.40	2

It is readily seen that, depending on the conditions of culture, the titre of œstrogenous substances in carrots can differ by as much as two-fold. Using the same procedure with wheat seeds, our figures were approximately 0.32 γ/100 of dry product of equivalent of diethylstilbœstrol for wheat growing on plots treated with nitrogen, phosphorus and potassium, and about 0.65 γ/100 for wheat growing on plots treated with farm manure.

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### Incipient Dioecy in Pimento

*Pimenta dioica* (Linn.) Merrill, known as allspice or pimento, is an important Jamaican crop and the island is the world's chief supplier. Unfortunately, improvement of the crop is hindered by a characteristic type of unfruitfulness among certain trees. The problem has long been recognized and was mentioned by P. Browne<sup>1</sup> in 1755.

The genus *Pimenta* (Myrtaceae) is mono-specific and is of tropical distribution. Its flowers have four sepals and petals, many anthers and an inferior bicarpellary ovary enclosed in a receptacle. The single style is curved, the plane of the curve coinciding with the septum between the carpels. The specific name alluding to dioecy is of Linnæan origin and was based on herbarium material<sup>2</sup>. Preserved specimens of barren plants differ from bearing ones in that the former have a relatively conspicuous development of anthers.

Previous workers have proposed different explanations of barrenness. Grisebach<sup>3</sup> assumed the plant to be dioecious, the barren plants functioning as males. Browne<sup>1</sup>, and more recently J. F. Ward<sup>4</sup>, on the basis of the hermaphrodite floral structure assumed barrenness was due to some physiological disorder.

The Jamaican Department of Agriculture has had a number of pimento trees under observation for several years, and it is known that barrenness is a property of certain trees and not a transient feature such as