" BISSA "

The Matting of Coconut Roots

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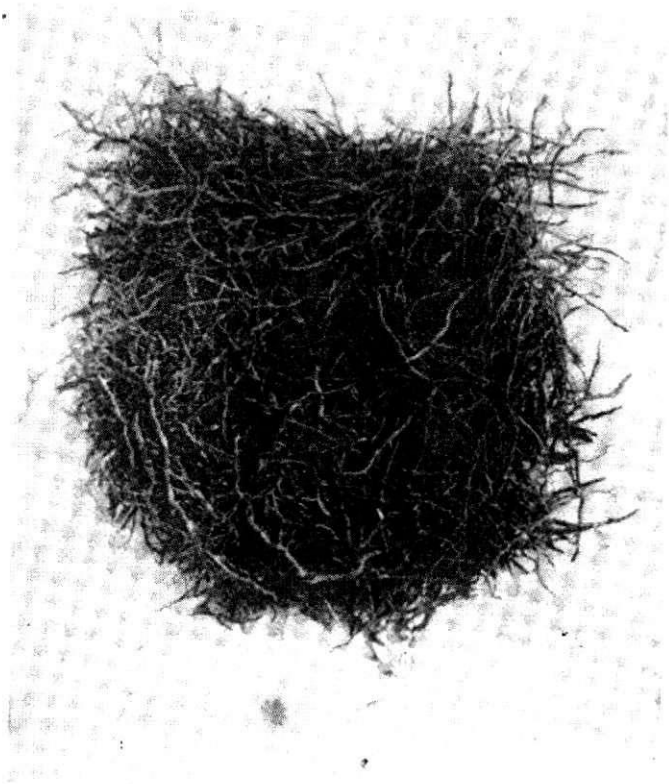
WHAT is " bissa ? " How is it formed ? Has such formation any ill-effects on the palm ? If so, what remedial methods would reduce, if not prevent this feature. This problem was discussed at a staff conference, recently held at Bandirippuwa.



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A top-view of a portion of the surface mat of roots of an affected palm with the soil removed.

Bissa is a thick mat of roots forming a circle several feet in diameter round the base of the palms, which are yellow, desiccated and unhealthy.

From the observations made it was concluded that this feature is generally found in regions where the land is water-logged during a large part of the year when the water table is high, and in loose, sandy areas with a basin or pan of coral " rock," clay or cabook. In both conditions there is generally a stagnant or immobile water condition. The palm, therefore, has to struggle for its existence and in doing so it will manifest unhealthy symptoms as compared with a palm growing in a more favourable environment.

A water-logged soil is poorly aerated, that is it lacks oxygen, which is an essential plant food and which is required by those soil organisms or bacteria which are necessary for the existence of plant life. Under such unhealthy conditions, the root system of the palm is not able to carry out its functions properly. Moreover, badly aerated and sour soils contain other types of bacteria

which are inimical to the healthy growth of plant life. Hence the tendency for the palm, in its fight for existence, will be to develop most of its roots in a region, more favourable. This is the surface nine inches of soil which is washed by the rain and is better aerated. Since the formation of these adventitious roots serves a useful purpose one is next confronted with the question "' why do palms exhibiting 'bissa' give such poor yields?"

Before going into this question, let us consider the functions of the root system of a plant. Roots have two main functions to perform. Mechanically, they anchor the plant in the soil and physiologically they absorb water along with plant nutrients from the soil. Absorption takes place in most cases through the walls of the root hairs; where these are absent, as in the case of the coconut palm, water is absorbed directly through the epidermis of the root. The older roots are incapable of absorption and serve only for conduction, support, and storage.

The fact that "bissa" is found where the palms are growing in land under conditions of prolonged high water table or insufficient drainage, indicates that it is an adaptation of the palm to a soil which is temporarily unsuitable to its growth. As in the case of marsh plants where respiratory roots are formed above the surface, the coconut palm under these conditions has similarly to develop a special root system. Mechanically a loose soil in such a condition is not able to anchor the plant as well as under normal conditions so that by establishing a thick elastic circular mat of roots at the base of the palm extra firmness or anchorage is given to the palm against the force of the wind; otherwise it may tilt and fall.

The anatomy of "bissa" roots is essentially the same as normal healthy roots except for their size; they are smaller, threadlike and more profusely branched, the branches ramifying in all directions to form the thick circular mat. This massive formation indicates firstly, that the upper layer of the soil is preferred by roots to the lower layers and secondly, that extra roots are necessary in order to obtain the maximum nutrition in the limited zone in which the roots are able to develop. Thus crops are gradually reduced as the soil nutrients in this shallow layer are gradually used up.

Treatment.—The mechanical removal or destruction of "bissa" alone obviously will not be sufficient as it will form again. It results in a temporary improvement since in cutting the "bissa" the land is cultivated, thereby aerating the top soil. Drainage to restore the land to a normal condition by removing the excess water and replacing it with air is the only real remedy. The greater the depth of drainage the better. This is not always possible owing to the lie of the land and in the case of low-lying areas it will be necessary to mound the bases of the palms. In this way the water-table is virtually lowered by raising the soil. Generally, however, low-lying areas which cannot be drained must be regarded as unsuitable for coconuts.

Manuring after such drainage is definitely advantageous since the fertility of the soil has been reduced during the period of water-logging. The "bissa" will need to be cut up and the surface cultivated so as to encourage normal root growth down into the subsoil.

It is to be concluded that "bissa" provides an "indicator" of an imperfectly-drained soil.

(Opinions on this important subject are invited from practical planters.—*Ed.*)