THE MENTEK DISEASE OF LOWLAND RICE IN INDONESIA [1] [2]

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INTRODUCTION

One of the most destructive diseases of lowland rice in Indonesia is mentek. The extent of the occurrence of the disease varies from year to year. In mentek years, several ten thousands of ha of rice are more or less seriously damaged. Complete crop failures are often the result of the occurrence of the disease.

The first symptoms of the disease may be recognized 3–8 weeks after transplanting and are sometimes even observed on seedbeds.

In the primary stage of the disease a *discoloration of leaftips proceeding along the leafmargins* is observed. This discoloration of leaves varies from yellowish to reddish or transitional colours according to varieties used, adequacy or deficiency of other nutrients and severeness of disease. Only the older leaves show this discoloration which at length extends over the total leafsurface. Young leaves are generally dark green.

Sometimes *inhibition of tillering* is recorded whereas in few other cases an increase of tillering was found.

Other external symptoms are a more or less seriously damaged rootsystem and a distinct susceptibility to root rot. Hence the fact that the disease is often designated as root rot.

Besides premature discoloration of leaves and root rot in the young stage no other symptoms are noticeable. In later stages, however, *elongation of leaves* (sheaths and laminae) *and internodia is retarded.* This inhibition of elongation of leaf and stem prevents in more serious cases also the *emergence* and *development of the panicles* which remain partly or wholly within the sheath of the last leaf. Seed formation may partly or wholly be *inhibited.* In less serious cases number and size of panicles are reduced. For full particulars of symptoms and description of the disease reference is made to KUILMAN (1936, 1941). This author summarized also the results of former investigations with regard to mentek.

The symptoms of mentek are more or less identical with those generally described for potash deficiency of various cereal crops (cf. SCHROPP, 1939, ECKSTEIN, BRUNO and TURRENTINE, 1937, BEAR et al. 1949, WALLACE, 1951, and COWIE, 1951).

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It is therefore not very surprising that KUILMAN (1936) demonstrated that rice plants grown in water culture deficient in potassium produced symptoms identical to those of mentek disease. There is, however, a gap between this knowledge and practice. Long term field experiments and also incidental field experiments with irrigated rice (contrary to dry rice) generally failed to show much effect of potassium fertilizers. In most experiments the rate of application was 1 quintal potassium sulphate per ha. With such a rate of application in combination with double superphosphate and ammonium sulphate generally only a slight increase in yield was affected (cf. VAN DE GOOR, 1952). Unfortunately in most experiments mentek did not occur seriously; therefore, only very scarce information with regard to the influence of potassium fertilizers on mentek under field conditions is available.

It is therefore still questionable whether the similarity of symptoms of mentek disease and of potash deficiency justifies an identification of both.

CAUSAL FACTORS

Different factors which enhance the occurrence of mentek disease are most often recognized (cf. KUILMAN, 1935).

1 Wet "dry season" i.e. rainfall far above the average.

2 Retarded transitional period between dry and wet season.

3 Bad physical condition of the soil.

4 Inadequate tillage of the soil.

5 Poor drainage.

6 Marshy conditions, low land.

7 Late sowing and transplanting date.

8 During initial growth and development dark cloudy weather, abruptly changing into bright weather.

In this connection it is worthwile to note that records of more serious attacks of mentek disease are from the lower plains and the more heavy soils of Central and East Java. Severe damage by this disease is more or less restricted to margalite and heavy clay soils. The other restriction is the location i.e. Central and East Java. Going from West to East Java the dry season becomes more pronounced. In many areas of West Java rice can be planted twice a year because of the higher rainfall.

It is therefore interesting that, although in West Java the dry season is generally less pronounced than in the other parts of the island, mentek occurs in this area less frequently. This is more or less contrary to the general opinion mentioned sub (1) that a wet "dry season" enhances the frequency of mentek. It should, however, be borne in mind that as a result of this difference in climate soil formation was different too.

The various causal factors lack experimental evidence. The points 1 to 6 are all pointing to an influence of physical or biological soil conditions.

A variation in these conditions as a result of the causal factors may change aeration, drainage, availability of nutrients *e.g.* fixation of potassium-ions, micro-flora and -fauna and weed growth. Rice plants growing under these changed conditions will react in the development of another root system.

Control measures

Control measures generally exist in efforts to complete the preparation of the soil when an adequate moisture supply for wet cultivation is guaranteed. In areas with a generally irregular water supply during the transitional period when soil has to be prepared or in areas where such an irregular water supply is to be expected, two systems occur to avoid hazards. The first system consists of sowing the seeds on dry seedbeds. Seedlings grow less quickly and can therefore remain longer on the seedbeds before being too old to be transplanted. In the second system transplanting is not the custom but the seeds are sown on dry cultivated fields. When after 5 to 6 weeks rains fall more regularly these fields are waterlogged. This system is known as *gogo-rantja.*

These measures are essentially preventive.

When the mentek disease is first observed the farmer generally drains the fields and sometimes the fields are again cultivated by trampling with the feet in the mud. These measures are of a restoring nature.

In variety tests it has been observed that certain varieties are less susceptible to mentek disease than others. Variety tests are very instructive and reveal that some varieties grown in the same field are not affected at all whereas other varieties fail completely as a result of mentek.

Kuilman (1941) found a relation between the fineness of roots and resistance against mentek.

It was already mentioned that worth-while information regarding the influence of potassium fertilizers as prophylaxis against the disease is not yet available.

This is due to the fact that it is as yet impossible to produce the disease artificially.

With phosphate fertilizers in phosphate deficient areas and with green manure on young vulcanic soils sometimes the disease was checked, whereas in some other cases the reverse was observed.

Mentek and similarity with diseases in other countries

Mentek has been connected with various diseases in other countries whether they are physiological or parasitical.

As with regard to mentek it is still questionable whether the causative agent is of physiological or perhaps parasitical (cf. van der Vecht and Bergman, 1952) origin it is fortuitous to identify it with diseases in other countries.

Conclusion

As mentek is a serious disease in many rice areas of Indonesia further investigations are necessary to determine its cause. When the cause is found it may be easier to find the necessary control measures.

Meanwhile a more detailed study on the influence of the structure of irrigated fields will give an insight as to the possible relation between this structure and the as yet unknown agent.

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