NURSERY DISORDERS AND ABNORMALITIES

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Highlights of the previous part :

The authors had thrown light on "Oil Palm Seed and Nursery Diseases". Being a new crop to India, the symptoms of many diseases are unfamiliar to the farmers and developmental workers associated with Oil Palm Cultivation. In Order to aid in diagnosing the diseases and help to take up appropriate control and preventive measures, the article had focused an diseases generally noticed at different stages of the crop. Second part of the article is continued.

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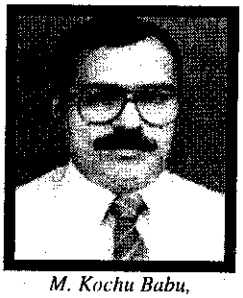

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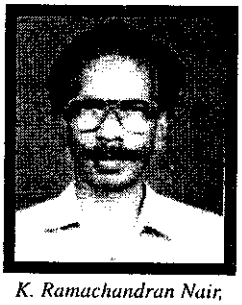

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I Nutritional :

The soil used for the potting mixture is an important factor for the normal growth of the seedlings. Application of major nutrients in excess can also lead to imbalance and manifestation of deficiency symptoms of other nutrients. Deficiency symptoms of nitrogen, magnesium and boron have been observed so far.

I.1 Nitrogen:

The leaflets are narrow and stiff giving an appearance of wider spacing between leaflets and the margin tend to roll inwards in the case of mild deficiency. With increased deficiency, the leaflets become lemon-yellow with the mid rib area turning bright yellow. Later on, the lamina turns light orange with a deep orange colouration along the mid rib and die back occurs starting from leaflet tips. The leaflet base (apocone) also turns deep orange.

Waterlogging within the bag, root damage by insects and mulching with saw dust or wood shavings are some of the causes. Avoid waterlogging in polybags. Select well drained area for nursery. Foliar application of urea or ammonium sulphate in the morning and evening hours at weekly intervals till symptom remission is recommended (2% urea spray at two to three leaf stage or Ammonium sulphate 60 gm. in 18 lit. of water for 400 seedlings).

I.2 Magnesium:

Deficiency of magnesium occurs on seedlings above five months of age. Seedlings become dull and lose glossiness. The oldest leaves (outer whorl leaves) show yellowing in the border areas which subsequently become brownish

from tip downwards due to infection by Pestalotiopsis. Retardation of leaf and root development occurs. Symptom expression on pinnate leaves is faster in the leaflets of upper plane than the ones in the lower plane.

The Mg status of the soil used for pot mixture governs the symptom expression. When the sand content of the pot mixture is higher, the deficiency symptoms are frequent. So also planting in soils where rubber was grown previously often leads to Mg deficiency. Excess application of other nutrients (nitrogen and potash) inhibits the availability of Mg. Mulching with bunch trash of Oil Palm increases level of K in soil which inhibits Mg availability.

Soil application of magnesium sulphate 7 g/seedling for seedlings upto 8 months of age and 15 g/seedling for seedlings above 8 months of age (or) foliar spray of 2% Epsom salt(magnesium sulphate) thrice at weekly intervals will help the seedlings to recover.

Induced deficiency caused by the application of other nutrients especially potash at higher levels is common than the actual deficiency due to the low reserves of boron in the pot mixture.

I.3 Boron:

Seen on seedlings of above two months of age. Seedlings of Elaeis oleifera and E. oleifera x E. guineensis are more susceptible to boron deficiency.

The symptoms are:

(a) Widening of angle between the two terminal leaflets of bifid leaf and the presence of long pendulous fibre.

(b) Appearance of small flaps or outgrowths on lamina.

(c) Hook leaf symptoms appear on pinnate leaves as in field palms.

(d) Reduction in leaf size occurs in advanced cases and cork like tissues are found at the edges of fused pinnae in extreme severity.

(e) Bristle tip and fish bone symptoms are also found.

Induced deficiency caused by the application of other nutrients especially potash at higher levels is common than the actual deficiency due to the low reserves of boron in the pot mixture. Foliar spray of 0.5% borax or application of 0.5 litre solution (25g borax or 20 g high grade fertilizer borax or 15 g boric acid dissolved in 100 litre of water) per polybag is necessary for rectifying the situation. Higher dose of boron fertilizers causes toxicity expressed as interveinal chlorosis and necrosis starting from leaf tip. In view of increased manifestation of boron deficiency in E. oleifera and hybrids of E. oleifera x E. guineensis, application of boron at the dosage mentioned above is suggested at 4, 7 and 10 months after planting in polybags.

I.4 White stripe:

White stripe is rare in the nursery and occurs mostly in the later stages. Young leaves become abnormally erect and rigid. Leaflets and internodal distance also become shorter. Yellow or white band develops in the interveinal area of leaf tips. Later on, chlorosis affects the whole lamina. The cause is unknown.

The fertilizer dosage is to be monitored. When the extent of occurrence of white stripe increases, application of nitrogenous and compound fertilizers are to be stopped. Application of phosphorus, potash and magnesium may be continued. As these seedlings give less yield when field planted, they are to be discarded.

Notable Maxim

If a little tree grows in the shade, it will not prosper.

II Abnormalities :

II.1 Transplantation shock:

This is common where two stage nursery is practised. Transplantation shock can predispose the seedlings to attack by many pathogens. The symptoms appear within one month after transplanting to secondary nursery. Reddish-brown scorched areas appear at the tip of leaves, usually on the youngest fully opened leaf. The leaves become pale and have papery consistency. The scorching extends to the whole leaf and causes purplish discolouration.

Damage to the roots at the time of transplantation is the cause. With the establishment of new roots, the seedling returns to normalcy. By adopting a single stage nursery, the occurrence of this can be eliminated. The planting of bare root seedlings should be avoided. Use of friable sandy soil makes it difficult to get the soil-root mass intact at the time of transplantation. In the case of two stage nursery, transplantation should be done at the right stage(five months after planting of sprouts).

When the fertilizers are applied in granular form, the granules lodged in the leaf axils cause patches of dead tissues on leaf bases. Heavy application of fertilizer causes general yellowing and die back of the leaves.

II.2 Fertilizer burn:

The fertilizer toxic effects are manifested on leaves, particularly on the tips. The affected area turn chlorotic which later becomes dark brown. When the fertilizers are applied in granular form, the granules lodged in the leaf axils cause patches of dead tissues on leaf bases. When roots also come in contact with fertilizer granules, they turn dark brown/black and are killed. Heavy application of fertilizer causes general yellowing and die back of the leaves.

When the levels of the condensation product in urea, biuret exceeds 0.6 to 0.7%, it causes scorching. In such cases, washing of the leaves with water is essential. Fertilizer granules are to be applied evenly to the polybag without touching the base of the stem or leaves.

II.3 Fungicide scorch:

Application of fungicides also often cause scorching and death of shoots of sprouts. Germinating seeds are susceptible to fungicides mixed with B.H.C.

Appearance of small circular to ovate light brown spots with depressed centres on leaves within a day of spraying is the symptom of copper toxicity. Coalescing of numerous spots causes necrosis. As the central tissue dies, the spots become dark brown with an yellow margin. The symptomatic leaves become papery. Dis-integration of central dead tissues by wind and water results in the production of numerous holes in the leaves.

Transverse rows of large lesions occur on the basal portion of young leaves as a result of mercurial fungicide accumulation on the base of the spear. These lesions have a reddish-brown border and paler centre resembling Corticium leaf rot. As fungicide damage is irreversible, care is to be taken to avoid application of such formulations having copper or mercury.

II.4 Sun scorch:

Sun scorch symptoms appear on seedlings upto six leaf stage when shade is removed too quickly. Yellowish areas can be seen more or less in the middle of the directly exposed leaf. The veins remain green. Small green portions of apparently unaffected tissues can also be seen in the affected yellowish areas.

II.5 Genetically abnormal seedlings:

Abnormalities of genetic origin are common in all nurseries. In a two stage nursery, culling out abnormal seedlings is to be done twice, the first two months after planting and the second after the transition from juvenile to pinnate stage. Culling percentage during the first phase is higher than the second. The

undesirable variants at the first phase are narrow leaf or grass leaf, rolled leaf and albino.

Variants on grownup seedlings are grouped under leaf abnormalities and form abnormalities. In the case of leaf abnormalities, the distance between leaflets are very short and the seedlings appear compressed. The seedlings with greater distance between leaflets are taller than the neighbouring seedlings. In seedlings with narrow lamina, the leaflets are inserted at an acute angle to the rachis or there may be lateral fusion of adjacent leaflets. Leaflets which are short appear broad.

1. Improper unfurling of leaves due to Collante

In the case of form abnormalities, the seedlings exhibit flat topped appearance due to successive production of short leaves/flaccidity of leaves. The seedlings have limp and short leaves which hang down. Seedlings with angle of insertion of leaves in abnormally acute angle are upright and have rigid appearance. Grown up seedlings are seen with fused leaflets. Exceptional high percentage of genetic abnormalities are observed in crosses made with pollen stored for long periods.

II.6 Developmental abnormalities:

II.6.1 Leaf enations and crinkle

Occurrence of puckering or laminar flaps is linked to temporary water deficit during leaf development and deficiency of boron in relation to application of potash.

II.6.2 Twisted leaf:

Emergence of twisted leaf is due to incorrect planting of sprouts. Occurrence of twisted leaf can be avoided by correct planting of sprouts with plumule upwards.

II.6.3 Collante:

Collante, a symptom associated with inadequate soil moisture condition, observed in all stages of nursery and seedlings planted in the field during summer months without adequate irrigation, is particularly severe in primary nursery. The emerging leaves have constriction on the middle of rachis, resulting in improper unfurling (Photo 1). The veins become prominent and the leaves turn rigid. In the case of extreme water stress, the leaves remain as a woody spike. In grownup seedlings, the symptoms are manifested on lower portions of the leaf. Yellowing is not usually seen. Occurrence of collante can be eliminated with adequate watering.

II.6.4 Hybrid leaf disorders:

Orange yellow spots of 2 to 3 mm diameter(transparent at the centre and opaque on the border) appear on young seedlings of two leaf stage. These spots turn brown and the entire lamina is affected. Growth is also retarded. The symptoms are due to the interaction of two allelic pairs (from both the species E. guineensis and E. oleifera) at a single locus. Parental palms showing such symptoms should be eliminated from hybridization.

(Part III will continue in July-August issue)