BARREN NUT PRODUCTION IN COCONUT

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The occurrence of barren nuts, nuts without or with imperfectly developed kernel is a familiar phenomenon met with in coconut gardens. It is estimated that a loss of about 3 per cent of the annual production of coconut is caused by this malady. This phenomenon which is as old as coconut cultivation itself had not received, until recently, the attention of the research workers to the extent needed. However, in the last few decades this problem has been engaging the attention of the research workers throughout the coconut growing regions. Detailed investigations have been carried out at the Central Plantation Crops Research Institute, Kasaragod to study this phenomenon in its different aspects. These studies have greatly helped to collect useful information on the nature, distribution, causes and other related aspects of this problem.

Nature of the barren nut

The barren nuts have certain conspicuous morphological characters. They are generally oblong in shape while the normal nuts of the same tree are roundish. The development of the husk in the barren nut is generally complete, but the quantity produced is very much less as compared to the normal ones. Sometimes, the outline of the barren nut assumes an irregular shape. The embryo in the barren nut is mostly absent. Often, these are seen shell and kernel imperfectly developed. The most common feature of the barren nut is the frequent splitting of the shell during the period of development. The barren nuts usually met with in coconut plantations, can be grouped into five distinct types based on certain morphological characters.

In the first type the development of husk and shell is normal. The embryo is often absent, and when present is found either improperly developed or in various stages of decay. The development of kernel in these nuts is mostly incomplete, often uneven in thickness. Sometimes the kernel is absent and the whole cavity is filled with water.

In the second type of barren nuts, the development of the husk is normal as in the first type. The shell, in spite of full development, is found to be cracked at the base. The kernel is partially developed, and rarely absent. Water inside the nut is absent.

The third type is almost similar to the second type, except for the difference that the nuts of this type show the cracks at the apex of the shell.

The fourth type is characterised by the presence of a very thick and hard shell, which is very much reduced forming 'pigmy' sized nuts. The kernel is mostly absent and when partially developed presents globular protuberances.

In the fifth type the development of the husk is complete, but the shell is rudimentary and solid in form without any trace of kernel in it. Of the five types mentioned above, the 2nd and 3rd types, having their shell cracked at the base and apex respectively, account for about 70 per cent of the total barren nut production.

Trends in production

Studies conducted at the Central Plantation Crops Research Institute, Kasaragod have shown that the production of barren nuts formed an erratic feature in coconut. A good number of trees (69-72%) in a plantation produce barren nuts below 3 per cent. Trees producing barren nuts to a larger extent are relatively few. About 2 per cent of the trees are observed to be completely free from signs of barrenness. Six per cent of the trees in a plantation showed this tendency every year. The production of barren nuts is observed to be more in trees giving an average yield of 40-60 nuts while it is considerably less in trees yielding more than 70 nuts. This phenomenon appeared to fluctuate from year to year and is relatively high during the months of April to July and low during September-October.

There seems to be some association between the types of barren nuts and their period of production. A predominent tendency is noticed among those trees producing barren nuts during March to June months to produce the 3rd type of barren nuts described above, i.e. barren nuts with shell cracked at the apex. Similarly trees producing more barren nuts during November to February months tend to produce more of type two i.e. barren nuts with shell cracked at the base. Individual trees producing both these types are very rarely met with. The other three types occur at random. Of these, the 5th type with rudimentary shell is more common in dwarf palms.

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Causes of barrenness

Investigations have indicated that different and entirely unrelated sets of factors are responsible for the production of different types of barren nuts. Pre-fertilization disturbance resulting in failure of fertilization appears to be responsible for the production of barren nuts with rudimentary solid shell. Work carried out at Central Plantation Crops Research Institute, Kasaragod revealed that barrenness could be induced by keeping female flowers unfertilised, indicating thereby, that defective fertilization may be one of the possible causes of barren nut production. Post fertilization disturbance of the normal metabolic processes is considered to be another factor responsible for the production of barren nuts. The two important types of barren nuts having cracks either at the base or at the apex of shells are the results of some post fertilization disturbances. Nutritional deficiency in the palm is another cause attributed to the incidence of barren nut production. Analytical studies, undertaken at Central Plantation Crops Research Institute, Kasaragod revealed that the level of moisture and nutrient elements is 2-3 times higher in barren nuts than in good nuts. Faulty metabolism rather than lack of available nutrients seems to orientate the formation of barren nuts. In spite of some good work in this direction, researchers have not fully succeeded in establishing convincing and conclusive reasons for the occurrence of barren nuts.

Problem of control

There is a popular belief among the cultivators that the application of common salt reduces the production of barren nuts. Experimental evidences do not, however, support this notion. An observational trial was undertaken at Central Plantation Crops Research Institute, Kasaragod to evaluate the effect of common salt on the production of barren nuts. No appreciable reduction in the incidence of barren nuts could be noticed in the treated palms. The possibility of reducing the incidence of barren nuts through heavy manuring was also tried with no marked beneficial results. Attempts were further made to find out, how the incidence of barren nuts could be checked by subjecting the palms to tapping for toddy. The results showed that there was little reduction in the percentage of barren nut production due to tapping. Artificial pollination and application of 'growth regulating substances' are some of the other control measures tried to check this disorder. It is noteworthy that none of these control measures was found effective in checking this wide-spread phenomenon.

It is not however improbable that this phenomenon is caused on account of excessive bearing. Nature provides a certain amount of safety to prevent exhaustion of the tree from overbearing, affording the tree to maintain a balance between production and its inherent capacity. It might be for this reason that many of the female flowers or 'buttons' are shed after fertilization and some others turn barren.

Studies have clearly shown that in the case of two major types of barren nuts, the cracking of the shell and consequent draining away of nut water set in by about 5th month of the development after the fertilization of the female flowers. It is, therefore, possible to harvest the potential barren nuts by about 5th month or alternatively to tap the bunches which produce barren nuts for toddy. The seasonal specificity of the two important types of barren nuts further makes it possible to watch and fix up the bunches which may contain potential barren nuts, on palms producing barren nuts.