IMPACT OF DROUGHT AND ASSOCIATED FACTORS ON GROWTH AND YIELD OF OIL PALM (ELAEIS GUINEENSIS JACQ)

P. THOMAS VARGHESE AND K.U.K. NAMPOOTHIRI
CPCRI Research Centre, Palode 695 562, Kerala

SUMMARY

Oil palm, a native of West Africa, is essentialy a tropical crop. Most of the research work on the crop has been carried out in African countries and in Malaysia. Studies conducted on the effect of rainfall, dry spell, sunshine hours, temperature and soil moisture on oil palm yield have direct relevance to Indian situation.

In Malaysia, monthly bunch yields of oil palm and its relationship with climatic variables upto 42 months prior to harvest were studied to establish their relationship. It was observed that rainfall at LAG 0, 10 - 12, 22 - 23, 33 months had positive correlation and at LAG 5 - 7, 16 - 18, 28 - 31, 39 - 41 had negative correlation with bunch yields. Temperature below 15°C adversely affected growth of oil palm seedlings whereas the growth was promoted upto 28°C. Effective sunshine hours was reported to be a reliable index of moisture stress on oil palm.

Soil moisture stress was found to reduce the net assimilation rate (NAR) values of seedlings when irrigation was prolonged. The effect of drought on yield of adult palms

is mainly through its influence on bunch number and bunch weight. The factors contributing to bunch number, viz., leaf production, sex ratio, floral abortion and bunch failure are all affected by water stress. It is reported that leaf production is reduced during dry season because the leaf opening in oil palm is delayed due to water stress. Stress also causes stomatal closure, inhibits photosynthetic activity and restricts crop growth. Reduction in sex ratio due to water stress could be rectified through irrigation. Floral abortion and bunch failure were also reported to be higher during stress conditions depending on the severity of drought. Water deficit was reported to be the major reason for the difference in bunch weight between Asian and African countries. Moisture availability has been found to be critical for spikelet formation, flower formation and fruit development. Water stress also results in incomplete ripening of fruits.

The water deficit of the equatorial belt, where oil palm is grown, ranges from 600 - 650 mm whereas in some Asian countries it ranges from 200 - 600 mm. In most of the countries 150 mm water per month was found to be sufficient for oil palm. Young palms are reported to transpire about 12 cm of water per month in Nigeria. An yield increase of 14 t/ha FEB due to irrigation has been reported. In Dahomey (Benin) 200 - 300% increase in yield was obtained due to irrigation. In Malaysia at Johore where rainfall was well distributed, about 10% increase in yield was

obtained due to irrigation. Water stress also reduces the oil content of mesocarp and thereby the oil to bunch ratio.

These findings have shown that avoiding moisture stress to oil palm by ensuring adequate supply of water to the top soil helped in increasing the leaf production, reducing the abortion rate, improving the sex ratio, increasing the bunch number and oil yields. It is therefore imperative to conduct experiments with a view to finding out the irrigation requirements of oil palm under diverse agroclimatic conditions in India.