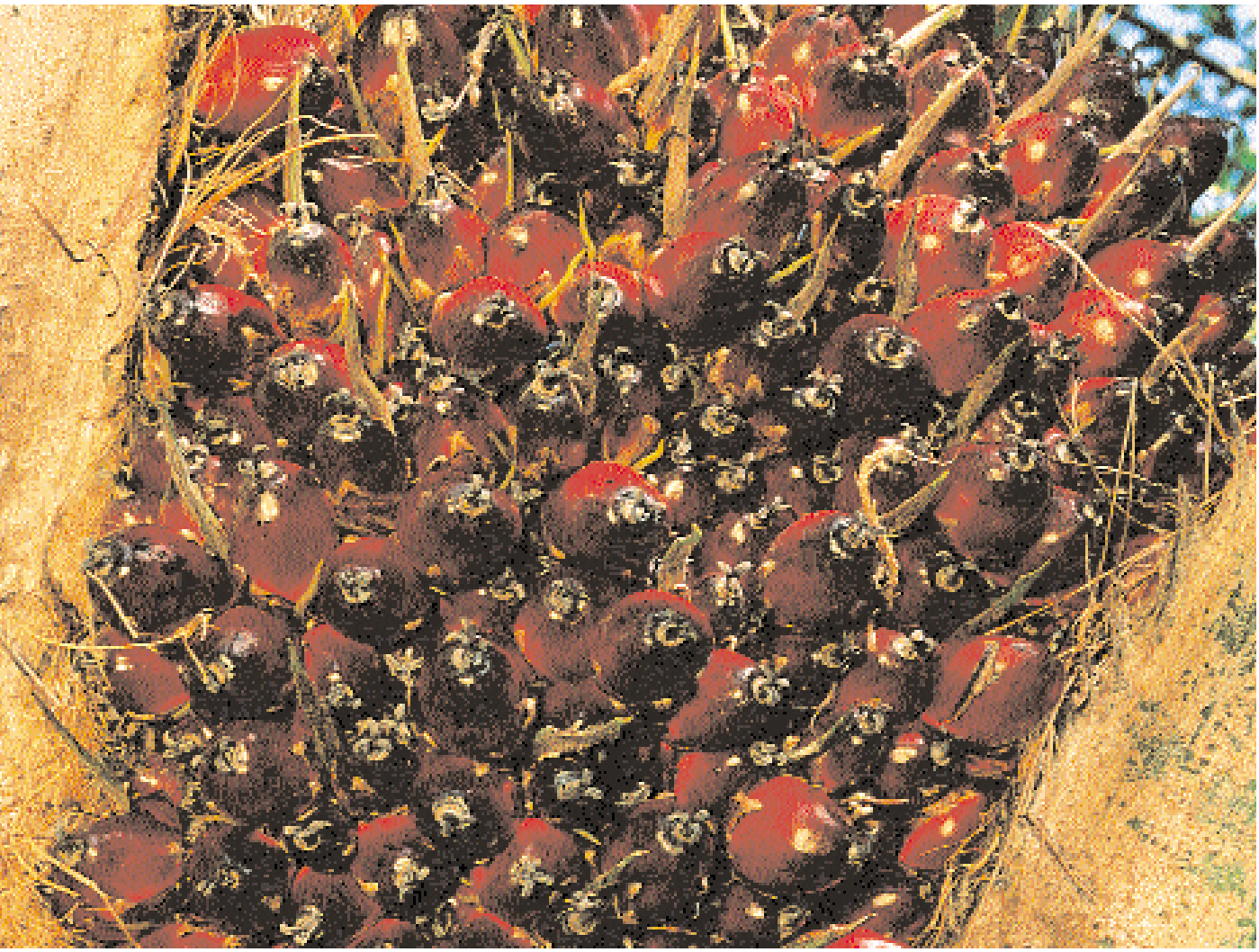

*Oil palm fruitlets*

# Of palm oil and boron (and vultures)

For people on vacation, they evoke pictures, dreams and memories of Mediterranean promenades and exotic tropical beaches and islands. To others, palm trees are far more than that: they are regarded as a valuable and vital component not only of life itself, but business and economic life too. It is said that there are more than a thousand uses for palms and their products.

For thousands of years they have provided most of the needs of humans living in the tropics. Since early in the 20th century, many species have become economically important, a major example being the oil palm. The products from this tree - palm oil and kernel oil - are now big business, traded internationally as commodities, and vitally important to the economies of several nations, particularly in southeast Asia.

Those vacationers will, probably unknowingly, be using palm oil to wash with (soap); be eating it (margarine and cooking oil); be lighting their dinner parties with it (candles); be smoothing it on their bodies (ointments and liniments); and be using products and machinery in which steel components have been manufactured with palm oil's help.

In these ways some 11 billion dollars-worth - 17 million tonnes - are used annually. Three quarters come from southeast Asia. Other major producing areas are Nigeria and South America. The largest producers by far are Malaysia, boasting half the world's industrial demand, and Indonesia with nearly a quarter.

Cultivation is intensive. In Malaysia, almost three million hectares are under oil palm plantation - something like a tenth of the country's whole land area. Demand - and the productivity to meet it - has been increasing recently by some eight percent a year.

Extra planting is one answer to this rising demand, but hectares are not limitless. Other food and cash crops need their space in the scheme of things. New tissue-cultured clonal materials can push yields to higher levels, but planters still need to optimize the yield of available acreage - and boron is often the key.

With two to six fresh fruit bunches being harvested from each tree every season (a hectare produces about four tonnes of crude palm oil a year), it is evident that successful plantations need regular inputs of nutrients to remain productive. The high organic content of the soils where oil palms are grown are by their nature boron-deficient: and the heavy seasonal rainfall which favors palm cultivation also has the effect of leaching soluble nutrients out of the soil year after year, as well as their being depleted by the plants' own usage and crop removal when the fresh fruit bunches are harvested.

Nature does her job watering the plants, but planters seeking high productivity also need to give their trees a maintenance diet. Standard 'NPK'[1] fertilizers - providing highly-demanded primary nutrients - are vital; but plants also hunger for a range of seven essential elemental micronutrients, of which boron is the most commonly needed. These, albeit needed in parts-per-million soil concentrations, are limiting factors: a shortage, and no amount of other added nutrients can prevent gross deficiency symptoms and major yield shortages. Boron is - or should be - as important to the planter as any other nutrient input.

Better plantation management and plant husbandry have served to satisfy yield expectations, but contrarily, these practices also make more and more boron-related demands on the palms and the land. New clonal varieties, bred for high fruiting performance, that is, larger fresh fruit bunches, require and remove more boron from the soil.

Boron works in mysterious ways. Its biochemical effects are by no means fully understood, but without it the growing tips of roots and shoots and fruiting organs do not develop or function properly. It is known also to be integral to cell membrane formation and function, and the fertilization process. It is strongly implicated in carbohydrate biosynthesis and calcium utilization, both important cellular processes.

In the oil palm, boron deficiency is often easily recognizable. A lengthy botanical dictionary of gross leaf and frond deformities has been documented. When boron is lacking, the signs quickly appear, but by the time these are visible it is usually too late to take remedial action for that harvest.

Once leaf deformities have been spotted, photosynthesis levels in the leaves will have fallen and the next season's crop of 'fruitlets' will be smaller, and of lower quality. Essentially, they will have suffered from malnutrition.


*Soaps and margarines contain palm oil*

**Borax and oil palms**

- Tailored borate fertilizers to suit different growth stages and application methods
- Readily available in all planting regions via experienced, efficient distributor network
- On-the-spot technical, agronomy and sales support from Borax
- Products produced by Borax, an ISO 9000 registered company

*Enough boron, healthy palm trees*

*A crinkled leaf is one of the early signs of boron deficiency in the oil palm.*

The good news: remedial boron, applied to the growing medium, allows the plantation to revert to normal for the next fruiting season. There is also a boron deficiency danger that even though physical symptoms may be absent, yield of oil palm fruits may not be at its peak. This 'hidden hunger' will have depressed yield.

A peculiarity of boron deficiency in oil palm plantations is that it might not be endemic throughout the stand. All palms might not be affected. It is not unusual for there to be many healthy, productive plants but they will be liberally interspersed with deficient specimens.

Avoiding these effects is simple and achievable during the normal fertilizer application regime. All that is needed is to include a boron maintenance or supplementation diet of 100 - 200 gm per tree annually to avoid the perils of boron deficiency: either alone, using *Fertibor*® borate for soil application or, best of all, *Granubor*® granular borate in conjunction with NPK granular blends. Young palm seedlings can be given a running start in the nursery with a foliar spray of *Solubor*® soluble fertilizer borate.

[1]*NPK - nitrogen-phosphorus-potassium - fertilizer mixtures are commonly available and used, but do not necessarily meet micronutrient needs. Planters should check with their supplier and specify boron-enriched formulations, or add their own.*

## And that vulture?

Palms are the oldest recognizable example of flowering plants (angiosperms): they arose from still unknown botanical origins 60 to 80 million years ago, between the Cretacious and Eocene eras.

Today *Elais guineensis* is found in tropical west Africa, southeast Asia, and equatorial South America. Its origin is unclear: very rarely have palm species naturally transcended continental boundaries.

Early explorers found it in Brazil, and it seems to have been bound into ancient cultures there. But only in the Gulf of Guinea, Africa, are there records of indigenous names for this palm - and its use long before the possible introduction to other continents by humans. There is also a closely-related species, *E. ubaghensis*, to be found there. Perhaps the clinching evidence is a bird: *Gyphohierax angolensis*, the oil palm vulture which is native to, and only found in tropical west Africa and is adapted for a diet consisting mainly of oil palm fruit.

It is believed that slaves took the plant westward across the Atlantic to the New World; it was taken eastward to what was then the Dutch East Indies in 1846, and commercial cultivation took off there in earnest early in the 20th century.