

Internal Transmission of Dutch Elm Disease

It is not known whether the development of the aggressive type of elm disease (see Gibbs *et al.*, *Nature*, **236**, 121; 1972), which has spread so rapidly and seriously in southern England and Wales in recent years, has been caused by the introduction into Britain of a more virulent strain or strains of *Ceratocystis ulmi*, or whether such strains have arisen *de novo* within the population of the fungus already present.

C. ulmi is a highly variable species, both morphologically and physiologically, and its ability to generate new forms, including those of changed virulence, through sexual or other genetical mechanisms is well known. Alternatively, the early development of centres of epidemic infection in north Kent, south Essex, and near Gloucester, Bristol, Southampton and Ipswich, might suggest importation of the disease from abroad on timber, crating or dunnage. The introduction into and the development of the disease in these areas, either from an external or internal source, could well be associated with the relatively high incidence there of sawmilling and associated timber industries.

The account by Burdekin and Gibbs in this issue of *Nature* (page 306) describes for the first time good evidence in Britain (based on observations made on trees infected naturally and experimentally) of the direct transmission of infection to wood of the current year's annual ring from the annual ring produced in the previous year. Careful examination of the small trees involved suggested that the normal scolytid beetle vectors of elm disease were in no way associated with this internal spread of the fungus. Internal transmission was apparently confined entirely to aggressive strains of *C. ulmi*.

Burdekin and Gibbs describe the significance of these observations to the present policy of sanitation felling in which it is recommended that only those trees with more than half the crown seriously affected should be removed and the bark destroyed. If infection can spread from year to year within trees without the need for the introduction of new infection each year through beetle maturation-feeding wounds, the effectiveness of the present sanitation felling measures could be far less than previously envisaged. To a large extent, the appar-

ent small effect of the policy of sanitation felling on the spread of infection during the past two years has confirmed this fear.

The ability of aggressive infection to spread into wood of the annual ring produced in the following year may also be of significance in relation to behaviour of the bark beetle in seriously affected areas in which large beetle populations have been generated. Because of factors associated with population pressures and the physiological condition of trees with slight crown infection (or those in which internal water relations have been affected by other factors), breeding by beetles may be attempted in the bark of mainstems and large low branches in the late summer and autumn. Even though this activity is abortive, if the breeding tunnels reach the wood and limited infection of an aggressive strain of *C. ulmi* develops therein, development of infection from these foci into the large vessels produced in the spring of the following year could spread rapidly and have a much more serious effect on the tree than comparable infection introduced through maturation-feeding wounds on small shoots in the crown.

Although not mentioned by Burdekin and Gibbs, their observations

underline a further weakness in the current programme of control of elm disease, about which there has been considerable public comment recently. If infection (by aggressive but not non-aggressive strains) can spread from year to year within the tree, it would seem imperative to attempt to confine aggressive infection to within the perimeter of the expanding areas already affected.

At present the Elm Disease Order allows the transportation of unbarked or otherwise untreated logs from infected areas to saw mills, furniture factories, and anywhere in Britain, with lorries perhaps loaded with logs carrying large populations of beetles at all stages of development, passing through large areas as yet apparently unaffected by aggressive-type infection. While in passage on lorries, infective adult beetles may emerge, with particularly high risk of successful emergence occurring during stops in lay-bys and at roadside cafés. Relative to the possible environmental, aesthetic and financial consequences, the immediate financial benefit to the timber trade of free movement of logs must be very small indeed, and the continuation of this activity in the south of Britain would appear to be quite untenable.—R. G. P.

Normal and Abnormal Globin Synthesis

IN *Nature New Biology* next week (December 6) Gianni *et al.* describe the identification of a globin messenger RNA, not associated with polysomes, in the cytoplasm of rabbit reticulocytes. They observe that, unlike the messenger isolated from polysomes, it directs only the synthesis of α chains.

In a density gradient centrifugation two RNA fractions were found, one with a sedimentation rate similar to EDTA-released messenger ribonucleoprotein, the other lighter fraction in the haemoglobin region of the gradient. RNA isolated from the heavier fraction had a sedimentation rate of 10S when analysed on polyacrylamide gels, and the RNA of the other fraction was resolved into two peaks of 7S and 4S RNA. Melting profiles of the RNA from both fractions gave evidence of secondary structure and base composition studies indicated that the lighter fraction contained RNA rich in guanine. These characteristics suggested that the extra-ribosomal heavy fraction might be an α mRNA. The occurrence of excess α chain mRNA in the extra-ribosomal

fraction may tie up with the report by Lodish of a decreased rate of ribosome attachment to each α mRNA relative to β mRNA.

In the same issue of *Nature New Biology*, Clegg and Weatherall report that although they have observed the same discrepancy between the α/β globin chain ratios in the marrow and peripheral blood as previous workers, nevertheless there is marked chain imbalance in the bone marrow of β -thalassaemia. The apparent differences between α/β chain ratios in the bone marrow and peripheral blood can be explained, at least in part, by the increased rate of α chain degradation in the marrow, and by the presence of contaminating non-globin protein (especially in bone marrow) which co-chromatograph with β chains in the CM cellulose system used for globin chain separation. These results are not compatible with previous theories of unstable β chain synthesis in marrow; they suggest that there is a reduced production of β chains which may be attributable to a lack of β mRNA.