not uncommon. In most cases, counts are between 30,000 and 60,000. Lesions caused by *R. similis* expand quickly and penetrate into the root as far as the central cylinder. The lesions then spread up, down and around the root. When this happens the central cylinder is no longer protected. Even if there is no other attack on the distal part of the root, it will decay along its whole length and tissues will die. There is a clear line of demarcation between healthy and necrotic tissues the colour of which is reddish black. In Madagascar, similar symptoms are caused by another Pratylenchid, *Zygotylenchus taomasinae*. De Guiran first found this species in diseased banana roots and also in *Ravelana madagascariensis*, a plant native to Madagascar where pure populations of this plant cover large areas. *Zygotylenchus taomasinae* has also been found in Reunion where it was almost certainly introduced with banana corms. No *Pratylenchus* sp. has been found on bananas in Africa with the exception of *P. goodeyi* in the Canary Islands where *R. similis* does not occur despite introductions of banana plants from Africa known to be infested with the burrowing nematode. Reports of surveys in Colombia refer to *R. similis* and *P. coffeae* but usually not in the same block and, therefore, it appears that these 2 species cannot invade the same plant. Where these 2 species were occasionally found together, *R. similis* causes more damage to the plant than *Pratylenchus* spp. Lesions caused by *Pratylenchus* spp. develop more slowly than those caused by *R. similis* and the central cylinder remains alive longer. The lesions are not clearly defined and their colour is at first indefinite, eventually becoming a uniform reddish-black. At this stage they closely resemble those caused by *R. similis*. The effects of attack by these species are destruction of the cells quickly followed by rotting. *Hoplolaimus pararobustus* is also endoparasitic, however; this species has a fairly long life cycle (2 to 3 mos) and populations seldom exceed 5,000 per 100 g of roots. Unlike *R. similis, H. pararobustus* remains alive in the soil without food for mos. It is now widespread in the Ivory Coast, but in 1960-1961 it was only found in plantations previously planted with Gros Michel introduced from Cameroon. The species has been described from that country where it is present in all banana plantations. Goodey also found it on oil palm roots. Spiral nematodes *Helicotylenchus multicinctus* and *H. dihystera* are present in all plantations, the former in the roots and the latter only in the soil. The damage is less serious than that caused by burrowing or lesions nematodes. It is only in the absence of these species that *Helicotylenchus* spp. populations attain a high level and cause damage in plantations. They only penetrate slowly and the damage is less severe than that caused by *R. similis*. They are easier to control, and although they can be of economic importance, *R. similis* remains the most serious pest. Other species of no economic importance found in West Africa and Madagascar are *Hemicycliophora oostenbrinkii*, common in the Ivory Coast, and *Tylenchus megacephalus*. Occasionally a gall caused by *Meloidogyne* spp. may develop but destruction of the roots by *R. similis* is too rapid for *Meloidogyne* to complete its life cycle.

POPULATION DYNAMICS OF *RADOPHOLUS SIMILIS* IN RELATION TO CLIMACTIC FACTORS AND THE PHYSIOLOGY OF THE PLANT [DINAMICA DE POBLACIONES DE *RADOPHOLUS SIMILIS* EN RELACION CON EL CLIMA Y FISIOLOGIA DE LA PLANTA]. A. Vilardebo, IRFA/GERDAT, B. P. 5035, 34032, Montpellier Cedex, France - - - Over a long period of time, no climactic factor has been found to be related with nematode infection of roots. Levels of infection had fluctuated erratically without any apparent significance, until a

different, more efficient, root extraction technique was used. The influence of climactic factors and the stage of plant development then became clear. The importance of soil structure and its relation to the persistance of *Radopholus similis* was known but, until now, it had not been adequately evaluated. This paper deals with the influence of climactic factors and plant development on root infection. The monthly average rainfall for a period of 15 yrs in Cameroon, where this study was conducted, shows an increase from January to June, followed by 4 mos with the same high monthly rainfall (350-400 mm). Precipitation levels decrease during November and December (20 mm monthly).

In this study bananas were planted in June. At first, root infection developed slowly and then accelerated rapidly. In one mo (November) *R. similis* increased from 40,000 to 100,000 per 100 g of roots. The peak was reached in December when the bananas started flowering. When the season (and the soil) became very dry, the population declined as quickly as it had risen; the lowest point (18,000/100 g) was in March. Then, as soil moisture became sufficient for plant growth, the numbers of nematodes in the roots increased steadily while the first ratoon was developing. A new population peak occurred in October, 2 mos earlier than in the previous yr. Again it appeared that as flowering began, the nematode populations declined; this too was earlier than in the previous yr but it ended in March as before. The third peak was in August, also earlier than in previous yrs. Again, the population decreased at flowering but this decline lasted for 7 mos, compared with the 2 and 5 mos of the 2 earlier crops. The population low (15,000 *R. similis*/100 g of roots) was also in March when most of the plants of the third ratoon had already flowered. After that the population increased but only for 4 mos. The peak was only 100,000 *R. similis* instead of 130,000 to 140,000/100 g as before. The decline in population began in July but was not as much (30,000/100 g) as in previous yrs.

These results clearly show: a) the dry season is unfavourable and the rainy season favourable to nematode infection, and b) the growing period of the banana plant favours development of populations. The trend is reversed when flowering begins. Amount of precipitation and flowering period are the main factors influencing development of *R. similis* infections. When both factors are favourable simultaneously, the population peak is high. However, minimum population always occurs in March at the end of the dry season. Data show how quickly *R. similis* populations may fluctuate. A further observation is that the highest populations are always found in the roots of plants which have flowered. Consequently, sampling of banana plantations to provide accurate information of the level or degree of nematode infection involves sampling at more than one occasion and the sampling of plants in a similar stage of development.

OTHER CONTRIBUTIONS – – – OTRAS CONTRIBUCIONES

CONTROL OF PLANTAIN NEMATODES WITH CONTACT NEMATICIDES [EL CONTROL DE LOS NEMATODOS QUE ATACAN EL PLATANO CON DOS NEMATICIDAS DE CONTACTO]. Santos Valle-Lamboy and Alejandro Ayala, Assistant Agronomist and Nematologist, Agricultural Experiment Station, College of Agricultural Sciences, Mayaguez Campus, University of Puerto Rico.

ABSTRACT

Nematodes associated with 4.5 mo-old plantains were controlled with carbo-