

THE STAIN CANKER OF PLANE TREE

The topic of my investigation are the possible remedies to the onset and propagation of stain canker in plane trees; the case I wish to deal with is in particular the case of the promenade along the lake in the city of Luino, but to better lighten this situation comparisons with what was applied in other circumstances are provided. Plantation along water bodies was particularly advisable, as reported by Pandolfi (1), while these trees requires clay soils and suffer on the contrary for the presence of acid soils.

The canker stain disease is caused by the fungus *Ceratocystis fimbriata*; it is able to produce suffering and even to bring to death those trees. In Luino the stain canker has affected nearly all of the plane trees of the lakeside promenade; according to data provided from Comune di Luino (2), most of them appear to be contaminated at the second stage, i.e. *diffuse withering*, which implies that the infected branches do hardly receive any feeding from the roots; unluckily withering cannot be discovered, unless during the vegetative period of the plant, and there is some divergence about the possibility to use these symptoms as a factor to lead an efficacious pruning, able to assist, rather than to furthermore damage the tree. To go deeper into understanding which remedies might be adopted, we investigate here below also the history of canker stain disease and the reproduction scheme of the *Ceratocystis fimbriata*.

This disease was first observed in 1935 along some urban streets in the East Coast of the United States. There a relation with car traffic development was envisaged. In Italy this fungus was most probably introduced after the Second World War through some wooden boxes containing US military goods. This is suggestive of the fact that even after plant eradication or infected branches cutting, the *Ceratocystis fimbriata*

fungus is still active, as furthermore recognised from a deliberation of the Minister of Agriculture and Forestry in 1987 (3).

This guideline suggested some measures regulating pruning and canopy head cutting, imposing to burn even sawdust from these operations: this, mainly for budget reasons, is not always observed in Italy, even not in Rome (4), where plane trees have a long history of environmental protection against pollution (the first individuals were planted in 1890). This especially because, “to spare time and money”, pruning is carried out subsequently on many trees in the same day, rather contributing than hindering the diffusion of this disease.

According to the reproduction mechanisms, one has to observe primarily that spores, that are responsible for the initiation of fungi attack to the tree, have a possible survival for two months, and are able therefore to enhance tree-to-tree contamination, especially in the case of windy regions. Of course an insufficient tree-to-tree distance rate, as affirmed also by Bruschi (5), means that branches of different trees may be close enough to exalt spores transfer. This process are not bare-eye discernible: it could be anyway sufficient the primary symptoms on the trees to give an essential contribution to the survival of the tree.

In effect, the brown bleaching that indicates the presence of perithecium, and hence the sexual reproduction of the tree, could easily appear to operators charged of pruning procedure and could therefore be pointed out to the competent authorities. Secondary symptoms instead, as already are generally well observed by pruning operator, since they consist mainly in the presence of dead branches or in the inefficient flux of nutritional substances into some part of the tree; their observation however cannot save the tree. According to Panconesi (6), for example, there are no possibilities at this stage other than to attempt to obtain a prolongation of the tree life,

through a control of the infection by an efficacious pruning, but the situation is not reversible. To give an idea of the time we dispose, the same author suggests that a rather young plane tree, whose trunk may have a 30-40 cm diameter, would survive to a single *Ceratocystis* infection no more than 3-4 years. Tabacchi (7) suggests moreover that eradication could not be sufficient, in what nearest plants could be already affected in an irreversible way. The relative rapidity of the propagation of this disease is demonstrated from data provided from the town administration of Forte dei Marmi (8), indicating that from 1973 to 1983 more than 70% of plane trees in that town were dead; the effects of stain canker are moreover enhanced by the, often verified, simultaneous presence of other plane trees diseases, such as *Gnomonia Platani* or other parasites, as was observed in Cattolica (9). The disease might propagate even faster in this case, since the tree, according to our actual knowledge, has no possibility of autonomous defence against it. By consequence, in Luino a diffuse sensation is that the town administration might dispose the indiscriminate substitution of plane tree with young trees of the same species. This is justified by the fear of the sudden falling down of weakest trees and the lack of specialised operators, able to continuously control each individual, whose height is even of 30 meters or more. This decision, although it could seem reasonable, might not stop the infection for the already exposed consideration (survival of the perithecium even in the sawdust, etc.). Furthermore, the immediate on-place burning of cut trunks is not practically realisable, then the *Ceratocystis fimbriata* would most probably survive.

Moreover this decision poses other questions, apart from the fact that the new trees could not -at least for the first years- have a comparable same effect, for as regards both the social function of the gardened area and the reduction of the pollution in the often crowded lakeside street. The first question may regard the fact that often all the

plane trees in an avenue may derive from clonation of an unique or few individuals (that is the so called genetic uniformity): this increase the possibility for this disease to become endemic, and if never this disease would come again, this would be again fatal for the entire plane tree population of the promenade. There is no reason moreover to believe that a young and healthy tree would be potentially less affected from this disease than an old one: to sum up, the factors that enhance the diffusion of the stain canker are mainly the proximity of other ill individuals, the possibility of easier spores attack through the effect of wind or the presence of fungi contaminated pruning residuals or sawdust, and the action of other parasites. In addition to that, all the behaviours that might produce a wound in any part of the tree (even, e.g. to hammer a nail in its bark) do accelerate the propagation of the disease.

Such diffusion might be on the contrary delayed and even stopped, if the stage of the disease is not yet advanced, by the larger dimensions of the tree, the absence of acid substances in the soil and of course from the cutting down of ill branches, the removal of tree regions that were infected by the presence of the perithecium and the eradication of closest incurable individuals. It could be better at this subject, to provide the substitution of *platanus occidentalis* (less sensitive to *Ceratocystis*) to the most commonly planted hybrid *platanus acerifolia*, or at least introduction of not cloned species, by buying new plane trees from some different providers, even not from our region or from abroad. This of course might be not applicable and bring costs to amounts that will be no more sustainable for town administration.

A further consideration would concern the approach to follow: as pointed out from TREES project of EC Joint Research Centre in Ispra (10), the trees in a more or less complex system (from a street-long trees row to e.g., the tropical forest) need to be treated as a *part of an ecosystem*, that requires to be studied as a whole, paying

attention to the interactions between the single individuals, also for as regards diseases. This should not exclude however the importance of *prevention*, that requires *tree-by-tree monitoring* and the thorough knowledge of the history of the single tree, as well as the observation of its present state (11). This should include, beyond to anti-parasite measures, the necessity to avoid some noxious procedures against plane trees, such as pruning them, giving to their canopies grotesque shapes. This means from a phytopatologic point of view to inflict unnecessary wounds to the tree and subsequently enhance the possibility for spores attack. Ideally, a “personalised” pruning procedure for any plane tree should be followed, aiming to compensate the problems and injuries it suffered in its previous life. A problem at this subject, beyond the support that each citizen can give to the monitoring, at least on the lower parts of the trunk, in Italy a need for a specific formation and/or for dendrosurgeons is necessary (12): more often in effect the interventions are more casual than really oriented to a better life for the tree.

Only a synergy of both these two approaches (systematic approach and tree-by-tree monitoring) might perhaps lead to an efficacious therapy, that could lead even to save some of ancient Luino plane trees.

References

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