

whereas it may be present in the Basel area. In the Netherlands the same is the case with *Macropsis fuscus* on raspberries. This vector does not occur in the Wageningen plantations.

*Answer:* The Pfeffinger disease spreads in orchards at a distance of 3–4 km from our trials at Wädenswil. If for transmission an insect vector would be indispensable, it also should occur in Wädenswil. Besides it was tried in 1944 to introduce the vector from Pfeffingen, but without any success.

MULDER: Has Dr BLUMER indeed no proof of the virus nature of witches' broom disease? How long ago did he carry out his transmission experiments?

*Answer:* The experiments were carried out already four years ago; during this time I could not find any symptoms on rootstocks grafted with diseased scions. This is in contradiction with the Dutch result.

T. Pl.ziekten 62 (1956): 69–72

## RECENT PROGRESS IN FRUIT TREE VIRUS RESEARCH IN ITALY

BY

RAFFAELE CIFERRI

Laboratorio Crittogamico, Pavia, Italy

Fruit culture in Italy is of the greatest economic importance. The area of specialized cultures of unmixed crops, was in the year 1953 of about 400.000 hectares for citrus, pomaceous and drupaceous plants, walnut, hazel-nut, carob and fig. The area of the olive trees (mixed and unmixed crops) is about 1.300.000 ha and that of grapevines, at all, about 4.000.000 ha.

In spite of the extensive culture of fruit trees, virus diseases are comparatively not very important, or at least their economic importance has not been ascertained, with a few exceptions. For instance, the virus diseases of cherry trees of almost universal distribution are not known in Italy. Nutrient deficiency diseases are apparently more important at least for some species (peach, cherry, citrus, olive, persimmon, and others), chiefly on the widely diffused cultures established on calcareous soils.

This is the reason why the studies of both groups of diseases are generally made by the same research workers, at least in the first phase of survey.

The objects of the most intensive research are actually:

- a. Apple and pear ('witches' broom'; B-deficiency);
- b. peach (K and P-deficiency);
- c. cherry (K and P-deficiency);
- d. almond (the complex of virus diseases);
- e. olive (B-deficiency and several virus or virus-like diseases);
- f. citrus (crinkly leaf psorosis; Zn and Mn-deficiency).

We report only about the most frequently occurring or important or peculiar virus diseases in Italy.

## POMACEOUS FRUITS

### 1. *Apple and pear*:

a. 'witches' broom' or 'proliferation': occurring in nurseries and less in orchards, in the Veneto, Trentino-Alto Adige and Emilia regions. This is an old Italian disease well known by nurserymen under the name of 'wildness' or 'wild apple'. The infected plants showing visible symptoms are destroyed in nursery, but a number of young symptomless plants are incidentally transported in the field.

This disease occurs in Holland and Switzerland and according to private information, also in Germany.

In the nursery the disease is of slow or quite slow natural spread and spreads very slowly in the orchards. The affected trees are long living, but the crop is without commercial value. In the orchard affected trees are very rare, so that the economic importance of the disease is very small.

Experimentally 'witches' broom' has been transmitted to apple and also to pear.

b. 'flat limb' is of increasing importance on the less cultivated 'Gravenstein', but also on the more frequently cultivated variety 'Abundance', specially in the Emilia region.

c. 'mosaic', wide spread, but apparently not important, chiefly in the Emilia and Veneto regions.

d. 'rubbery wood' (doubtful) in nurseries, in the Toscana region.

## DRUPACEOUS FRUITS

1. *Peach*: infected plants are rare and of no economic importance, with the exception of:

a. 'rosetting willow-leaves', frequently occurring, but localized in the Liguria region. The general symptoms resemble those of 'peach rosette' or 'rosette mosaic', but may be better named 'stunt'. The disease has been transmitted experimentally.

The other virus diseases of peach that can be mentioned, but with little or any economic importance are:

b. 'peach wart', very localized and unimportant in the Piemonte and may be also in the Veneto region;

c. 'peach calico' (in Italy reported as 'peach mosaic'); occurring in the Emilia region, but apparently of small economic importance; this disease has been transmitted experimentally.

d. 'ring-spot', 'peach mottle' and 'peach blotch', of which presence is doubtful.

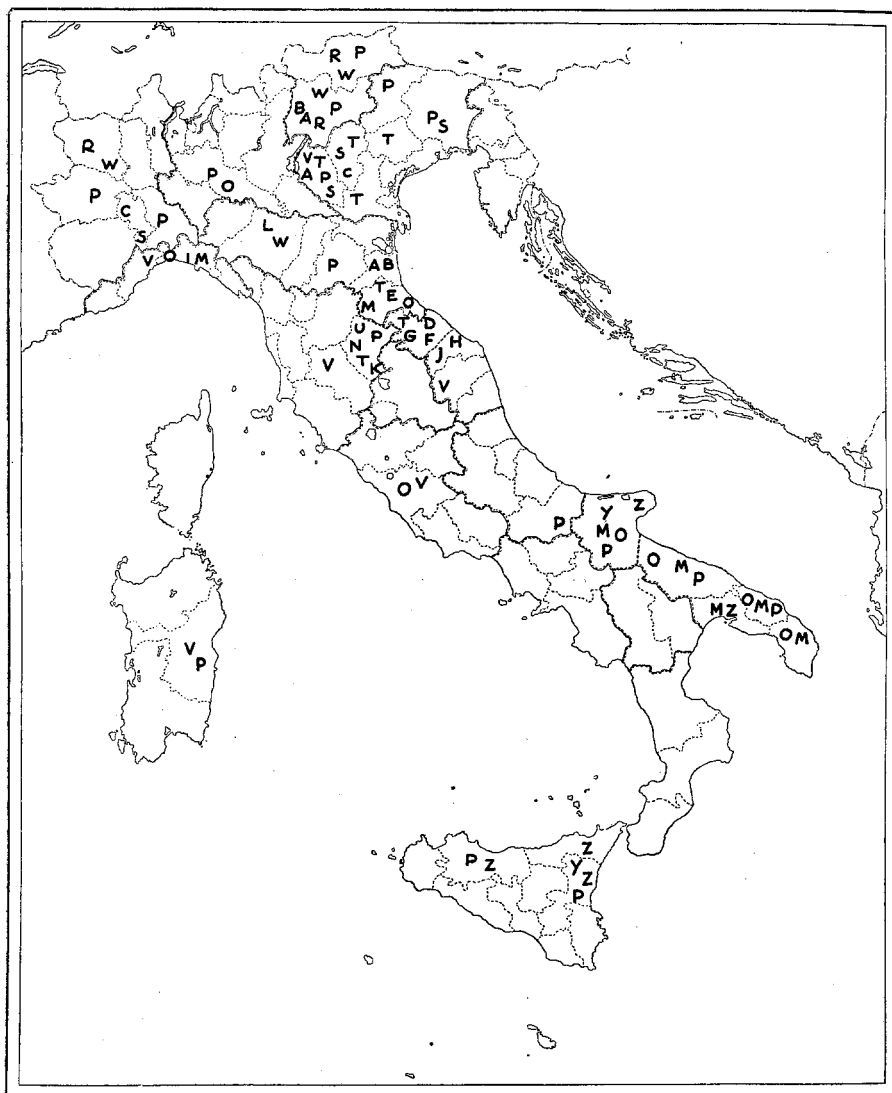
### 2. *Plum*:

a. only a few plants of Shiro variety, in the Toscana region, show symptoms of 'line pattern', particularly in that form reported in the literature as 'golden net'. Very localized and unimportant.

b. 'white spot', on scattered young trees in the Puglia region. Unimportant.

c. The prune 'leaf spot' of uncertain ethiology has been found in Toscana region.

# ORIENTATIVE DISTRIBUTION OF VIRUS, VIRUS-LIKE DISEASES AND NUTRIENT DEFICIENCIES ON FRUIT TREES IN ITALY



**A** = 'Witches' broom' of Apple  
**B** = 'Crinkle-wood' of Apple  
**C** = 'peach-wart'  
**D** = 'peach-calico'  
**E** = 'ring-spot' of Peach  
**F** = 'peach-rosette'  
**G** = 'peach-mottle'  
**H** = 'peach-blotch'  
**I** = 'rosetting-willow leaves' of Peach  
**L** = 'pinto leaf' of Cherry

**M** = virus diseases of Almond  
**N** = 'golden-net' of Plum  
**O** = 'mosaic' of Fig  
**P** = 'infective degeneration' of Vine  
**R** = 'die-back' of Apple and Pear  
**S** = 'phloem-necrosis' of Peach  
**T** = 'die-back' of Cherry  
**U** = 'Calico' and 'leaf-spot' of Plum

**V** = 'phloem-necrosis' of Olive  
**Z** = nutrient deficiencies of Citrus  
**Y** = 'crinkly-leaf psorosis' of Citrus  
**W** = B-deficiency of Apple and Pear  
**J** = 'black-nerved leaves' of Persimmon  
**K** = 'rubbery wood' of Apple

3. *Almond*: the virus diseases of this species have been the object of a special lecture by G. SCARAMUZZI.

*Fig*: the 'mosaic' is universally occurring in Italy, so that it is almost impossible to find a healthy tree. Probably several virus diseases are confused under this name. The american vector *Aceria fici* has recently been found also in Italy. The economic importance of the disease has not yet been recognized. Transmission experiments have been carried out successfully.

*Citrus*: 'crinkly leaf psorosis' has been reported from Sicilia, Puglia, Liguria and Veneto regions, but specimens are rare. Up til now this disease has not been transmitted experimentally.

*Olive*: the complex 'phloem-necrosis' that has been supposed to be a virus disease is in fact due to B-deficiency. But a number of symptoms remain to be explained, as 'witches' broom' and leaf malformations of different kind, probably with the exclusion of 'sickle-leaf' caused by the scale *Pollinia pollini*.

#### DISCUSSION

MULDER: Why does Prof. CIFERRI think that witches' broom of olive and of apple might be the same? Have there been done any cross transmission between olive and apple?

Answer: This has not been affirmed. Only the common names of the diseases are the same.

MULDER: Between Verona and Bologna there are a lot of Elm trees showing witches' broom symptoms. Has this disease been found to be a virus disease?

Answer: No, this has not yet been in research.

T. Pl.ziekten 62 (1956): 72-75

### BETRACHTUNGEN ZUR SYMPTOMATOLOGIE DER OBSTBAULICHEN ABBAUKRANKHEITEN<sup>1)</sup>

VON

H. THIEM

Heidelberg, West Deutschland

#### AUSZUG ZUR VERBREITUNG EINIGER OBSTBAULICHEN VIRUSKRANKHEITEN

1. Im Obstbau sind die *Mosaik-Symptome* als Ringe – auch solche mit Nekrosen (Abb. 1) –, Bänder, Ölflecke, Ölfächen, Streifen u.a. bei uns sehr verbreitet. Ich kenne keine grösseren Kirschen- und Pflaumenanlagen, in denen die eine oder andere Form des Mosaik nicht vorkommt. Im allgemeinen sind sie auf den jeweils befallenen Bäumen nicht sehr häufig. Verhältnismässig selten treten sie auf einer Pflanze gleichmässig verbreitet auf. Auf dem Versuchsfeld der Biologischen Bundesanstalt in Heidelberg steht eine Schöne aus Löwen mit seit Jahren sehr starker Verbänderung (line pattern) auf fast jedem Blatt. Ich kenne einen Hausgarten mit ausgesprochen grossen und zahlreichen Bän-

<sup>1)</sup> Der Deutschen Forschungsgemeinschaft sei für die Unterstützung der Untersuchungen auch an dieser Stelle gedankt.