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VIRUS DISEASES OF CEREALS AND LEGUMINOUS PLANTS

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Recently there have been reported, with steadily increasing frequency, instances of the occurrence of new, destructive virus diseases of cereals in Western and Northern Europe, particularly in the countries bordering upon the USSR, for example in Finland, Poland, Czechoslovakia and Rumania. This makes it necessary to give most earnest attention to this particular group of diseases. The foregoing allegation is substantiated by the fact that only within the period from 1960 to 1964 there have been found in the USSR at least six virus diseases of cereals not previously known to occur in our country. Some pathogens have not yet been fully identified. ()

Wheat streak mosaic virus (Marmor virgatum var. typicum McK.) was first observed in the USSR during 1962 in the Krasnodarskiy Kray (G. M. Razvyazkina, Ye. A. Kapkova, Yu. V. Belyanichikova, 1963), and later in the Tashkentskaya Oblast in 1963 (G. M. Razvyazkina, N. I. Gorbunova, 1965). In 1964, in the foothills and steppe districts of Stavropol'skiy Kray infection of the wheat of Bezostaya-1 variety reached 30-35% on some fields. A very severe infection in the spring was observed in the Yessentuki entomo-phyto-plot area, following early seeding: from 25 August 1961 -- 16.1%; from 28 August 1962 -- 25.8%; from 5 September 1963 -- 51.1%. Seeding of winter crop during the optimal and late-optimal periods is the principal disease-control measure.

Winter-wheat plants are most susceptible to the pathogen and are also the favorite host of its carrier, namely the mite Aceria tulipae (K.).

Wheat dwarfing virus was observed focally in Krasnodarskiy Kray (Ye. A. Pridantseva, 1964), in a number of oblasts of the Ukraine, under the designation of "pale-green wheat dwarfing" (V. A. Agarkov, A. V. Kiyashko, A. N. Oleynik, 1964) and apparently in the Stavropol'skiy Kray. In the Volga region infection of the plants remained at about the 1963 level, and on individual fields it varied from 3.0 to 4.4%. This disease is apparently identical with the wheat dwarfing virus recorded in Czechoslovakia (Vacke, 1961).

Common or Russian winter- and summer-wheat mosaic (Triticum virus 8 Zashurilo et Sitnikova) was recorded without any apparent increase, as before, on cereals in the Volga region. Thus, on the winter-wheat fields of the training farm of the Kuybyshev Agricultural Institute the percentage of mosaic infection varied from 0.4 to 2.5%, whereas on millet it did not exceed 1.2% on the average, as compared with 12% in 1963.

Barley yellow dwarf virus was observed on barley in the Krasnodarskiy Kray. No information was received from other sites.

Barley false stripe virus was first found in the USSR during 1960 in the Moscow Oblast (I. G. Atabekov and G. M. Razvyazkina, 1961). In 1964, infection of plants with this virus was observed in Latvian SSR. The disease has increased in the Volga region. While in 1963 it was encountered in isolated instances on production crops, in 1964 the infection reached 2.1% on the Kinel'skiy-5 variety. The virus has not been found on the Omskiy 13709 variety, the seed of which had been imported from Siberia. The virus may cause significant damage to seeded crops, since it is transmitted by pollen and seeds.

Oat pseudo-rosette disease virus (Practilinea avenae, No Kinney) has been recorded, as in the previous years, on oats in Siberia and the Far East.

In recent years many instances of corn infection by this virus have been reported. Thus, in the northwestern arid part of the Kulundinskaya Steppe, in the Altayskiy Kray, symptoms of leaf stripes have been noted on 30-50% of the plants.

In the foothill districts of the Kray was often observed a "saberlike" curvature of the corn stalks; on individual fields were found about 80-90% of diseased stalks.

Sterile dwarfing of oats was again found in Kuybyshevskaya Oblast (VIZR Aspirant S. B. Gerasimov). On the fields of training farm of the Kuybyshev Agricultural Institute 1.8% of the oat plants were infected, on the average.

It was ascertained that the virus carrier is the small leafhopper Macrostelus laevis Rib.

Leaf stripe of corn and millet was observed during summer in the Krasnodarskiy Kray (T. S. Dubonosov and I. V. Panarin).

Reduced height of corn, white and yellow mosaic, and also leaf tattering were observed in the Kuybyshevskaya Oblast.

Rye mosaic has been recorded in Voronezhskaya Oblast.

Further spreading of virus diseases of cereals should be expected primarily where foci of infection had been present on the crops, shattered seed and weeds. The latter constitute a reservoir of many viruses and their carriers (leafhoppers, aphids, mites). Degree of grain-crop infection will be determined, in addition, by conditions favorable to the maintenance of normal population and activity of the carriers.

Common bean mosaic (Phaseolus virus 1 Smith.) has been found in Kiyevskaya, Zakarpatskaya, L'vovskaya, Ivano-Frankovskaya, Kirovogradskaya, Sumskaya, Poltavskaya, Khersonskaya and Khar'kovskaya oblasts (P. F. Baratova, 1964), and also in the other districts of its usual occurrence (chiefly in the Northern Caucasus).

Common mosaic (Pisum virus 2 Smith.) and deformative mosaic (Pisum virus 1) have been found on peas in many zones of the USSR. Deformative mosaic was most frequently encountered.

Mosaic diseases of forage beans (Pisum virus 1; Pisum virus 2; Phaseolus virus 2) were found almost everywhere in the Western Ukraine. A considerable degree of bean infection was recorded in the L'vovskaya Oblast.

Bear yellows were found in the northwestern zone.

Virus diseases of soybeans, cowpeas and mung beans were observed, as in the past, in the Uzbek SSR. Individual plants in mixing plantings were heavily infected.

Narrow-leaf of lupines (Phaseolus virus 2) was noted, in addition to the previously known zones of its occurrence, in L'vovskaya Oblast during 1964.

The carriers of the above-noted virus diseases of leguminous crops are various species of aphids (black bean-aphid, pea aphid, apricot aphid, and others), and the reservoir plants of many of the listed viruses are infected stands of clover and alfalfa; in the case of bean yellows virus these reservoirs are weeds of Compositae family (Cirsium arvense and others). The causative agents of soybean mosaic, narrow-leaf of lupines, common bean mosaic and cowpea mosaic are transmitted with the seeds.

The prevalence of viruses on leguminous crops during 1965 will depend on a complex of factors: population of aphid-carriers, extent of weed-infestation of the fields, and so forth. The implementation of preventive measures described in the literature will make it possible appreciably to decrease the spreading and harmful effects of the above-stated causative agents.