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Preliminary communication

AN ISOLATE OF BLACK EYE COWPEA MOSAIC VIRUS FROM DALMATIA

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From cowpea (*Vigna unguiculata* (L.) Walp.), found as a wild plant on the Dalmatian island of Dugi and showing dark green and/or yellow mosaic and vein banding, a filamentous virus has been isolated and studied. According to the host range, symptomatology, properties *in vitro*, particle morphology as well as the presence of cylindrical inclusions and ultrastructural changes, the isolated virus may be considered as an isolate of black eye cowpea mosaic virus.

Cowpea plants, *Vigna unguiculata* (L.) Walp., showing mosaic symptoms (Fig. 4) were found in a locality of the Dalmatian island of Dugi grown as wild plants. Cowpea has not been cultivated in Dalmatia as a crop, except occasionally long time ago when it was grown in small gardens as an ornamental plant or vegetable. Now it has disappeared and can be found only as a wild plant.

Leaves of naturally infected cowpea were used to prepare inoculum to infect herbaceous hosts, mechanically by sap. The inoculated *V. unguiculata* cvs. Midget and Iron Clay showed symptoms 10—14 days after inoculations: chlorotic lesions, on inoculated primary leaves, and a characteristic deep green/or yellow mosaic and veinbanding on trifoliolate leaves (Figs. 2, 3). Besides *V. unguiculata* cvs., the isolated virus (isolate CD) infected systemically *Phaseolus vulgaris* Top crop, *Glycine max* (soybean), *Pisum sativum* and *Nicotiana clevelandii*. Only locally it infected *Phaseolus lunatus*, *Gomphrena globosa*, *Chenopodium amaranticolor* and *C. quinoa*. The isolate did not infect *Vicia faba*, *Trifolium pratense*, *Ocimum basilicum* and *N. tabacum* White Burley.

The properties were also examined *in vitro*. The infectious sap diluted with distilled water lost the infectivity at 10^{-3} ; it was inactivated in 10 min between 55—60°C; longevity *in vitro* was two days at 24°C.

In leaf dip preparations flexuous filamentous particles c. 760 nm long were observed by electron microscopy. In thin sections through infected leaf tissue prepared by standard procedure (Štefanac and Wrisher 1983), cytoplasmic cylindrical inclusions — pinwheels and scrolls — characteristic of the subdivision I of potyvirus inclusions classification scheme were noticed; groups of vesicles in cytoplasm were observed, too (cf. Christie and Edwardson 1977, Lesemann 1988). In tonoplast membrane monolayers of virus particles in tangential section were present (Fig. 5).

In serological tests performed in SDS immunodiffusion in gel, the CD isolate did not react with antisera to bean yellow mosaic, soybean mosaic and bean common mosaic viruses. Two other potyviruses are known till now to infect cowpea: cowpea aphid borne mosaic (CABMV) and blackeye cowpea mosaic (BCMV) viruses. CABMV was first recorded in Italy by Vidano and Conti (1965), described by Lovisollo and Conti (1966), Bock (1973), Bock and Conti (1974) and recorded in Morocco by Fischer and Lockhart (1976). BCMV was described by Purcifull and Gonsalves (1985), and serologically studied by Taiwo and Gonsalves and by Taiwo et al. (1982). The characteristic symptoms induced by CABMV are the distortion and blistering of cowpea leaves. The virus also provokes a specific local reaction in *Ocimum basilicum* which is considered as a characteristic feature of CABMV (Lovisollo and Conti 1966, Bock and Conti 1974). Vein clearing, vein banding and various types of mosaic are characteristics of BCMV.

The CD isolate differs from CABMV in the manifestation of symptoms and failure to infect *Ocimum basilicum*. As the type culture of CABMV had been lost it was impossible to compare the CD isolate with it.

Based on the morphology of particles, characteristics in ultrastructure, host range, symptomatology and properties *in vitro* the Dalmatian cowpea isolate may be considered as an isolate of BCMV.

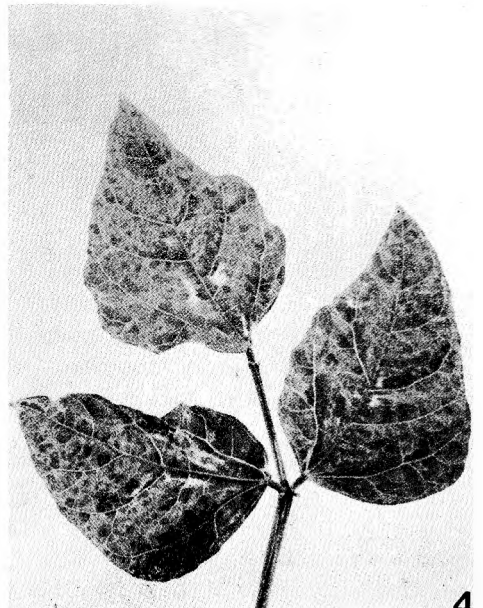
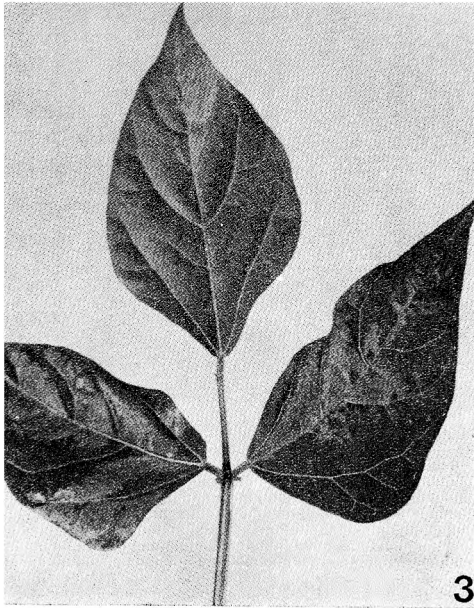
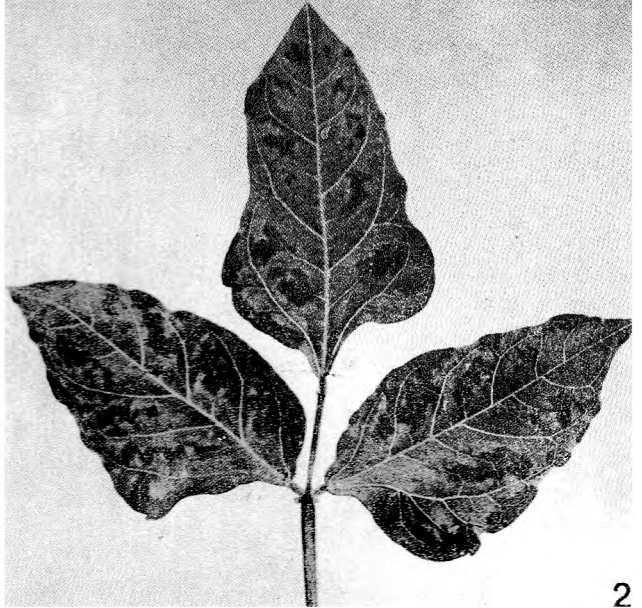
On a few soybean seedlings, recently raised from seed produced at the State farm Makoua (Congo Brazzaville) and supplied for research purposes by a FAO expert, symptoms of mottling and mild blistering were noticed (Fig. 1). From plants with symptoms a filamentous virus

Fig. 1. Symptoms of blackeye cowpea mosaic virus (BCMV) on soybean (*Glycine max*) seedling infected through the seed.

Fig. 2. Mosaic and vein banding symptoms on trifoliolate leaves of cowpea (*Vigna unguiculata* cv. Midget) infected by mechanical inoculation with Dalmatian isolate of BCMV from cowpea (CD isolate).

Fig. 3. Symptoms on trifoliolate leaf of *V. unguiculata* cv. Iron clay infected by mechanical inoculation with CD isolate.

Fig. 4. Naturally infected cowpea (source plant of CD isolate)



Figs. 1—4.

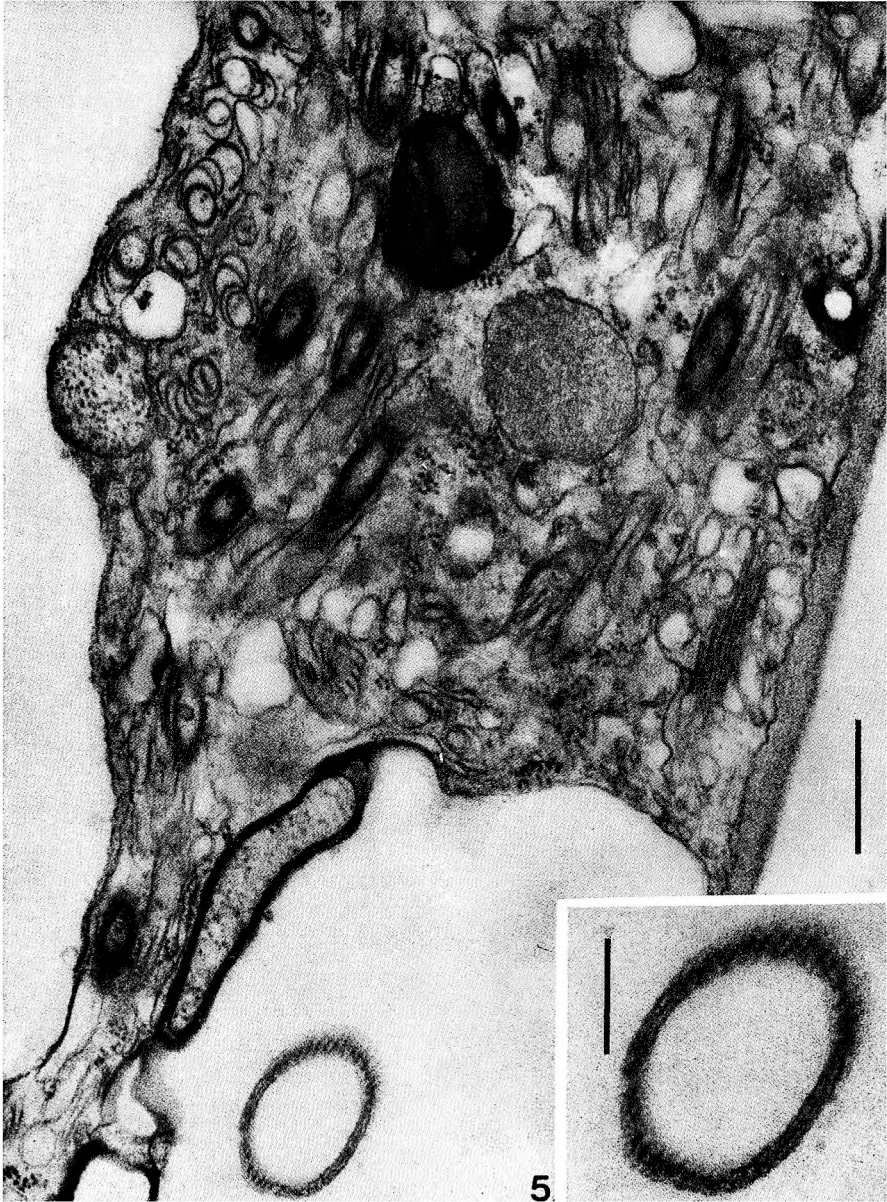


Fig. 5.

c. 760 nm long was isolated which showed some similarity with the CD isolate in symptom manifestation. In *Vigna unguiculata* it induced similar but milder symptoms than the CD isolate and also failed to cause local reaction on *Ocimum basilicum*.

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 Fig. 5. Electron micrograph of thin section of CD infected cowpea leaf showing cylindrical inclusions and ultrastructural changes. Insert shows monolayer of virus particles in tonoplast membrane, in tangential section. Bars represent 500 nm.

SAŽETAK

IZOLAT VIRUSA MOZAIKA CRNOOKICE IZ VRSTE
VIGNA UNGUICULATA (L.) WALP. IZ DALMACIJE

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Iz biljke crnookice (*Vigna unguiculata* (L.) Walp., samonikle, sa simptomima tamnozelenog i žutog mozaika te mozaika duž lisnih žila, izoliran je nitasti virus. Prema krugu domaćina, simptomima, svojstvima *in vitro* kao i po morfologiji virusnih čestica, prisustva cilindričnih uklopina i promjena u ultrastrukturi stanice, smatra se da se radi o izolatu virusa mozaika crnookice — Blackeye cowpea mosaic potyvirus.

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