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A NEW SEVERE MOSAIC DISEASE OF OPIUM POPPY

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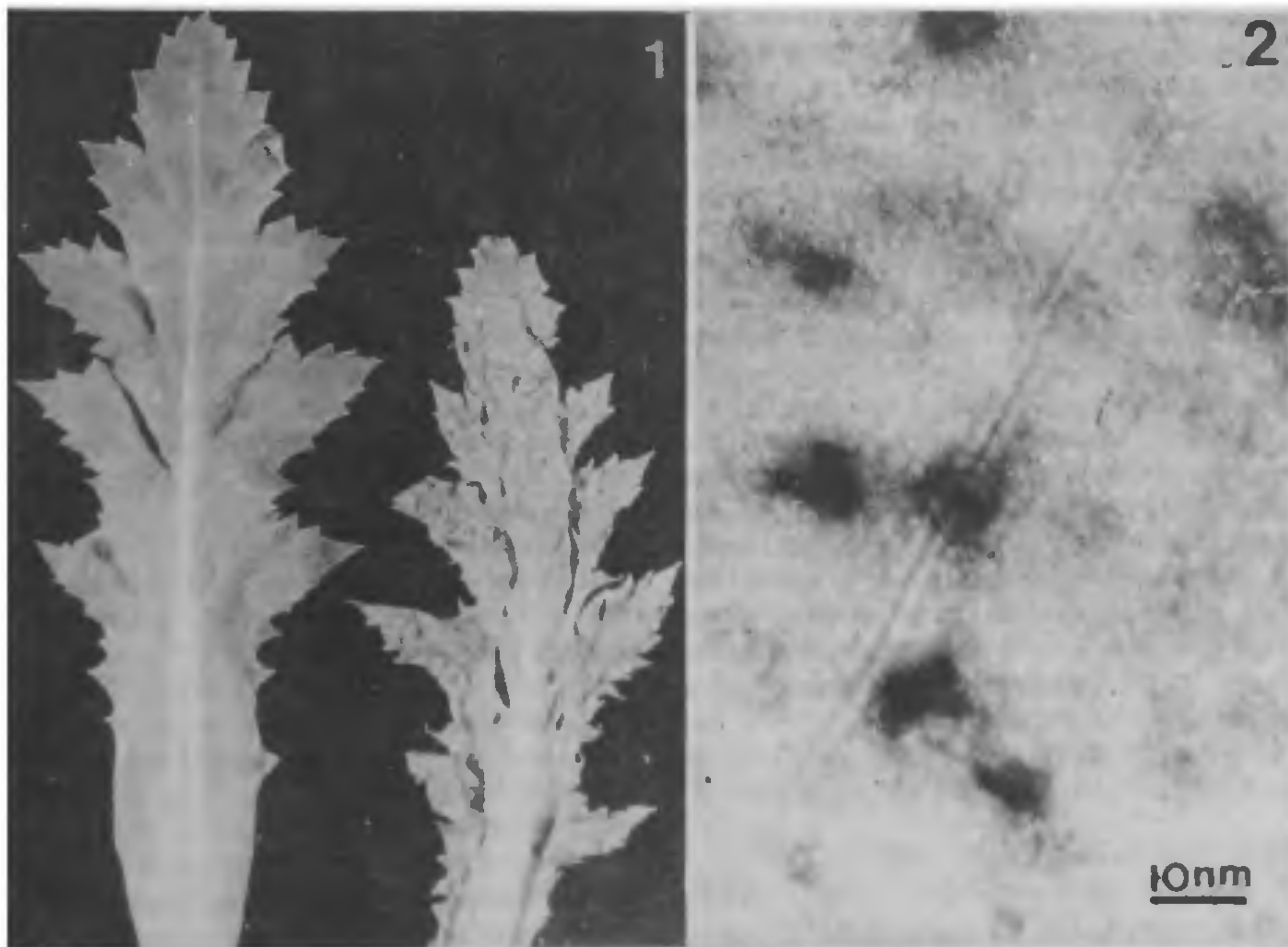
OPIUM poppy (*Papaver somniferum* L.) is an important medicinal plant cultivated on a large scale in India. It contains several alkaloids; among them morphine, codeine, thebaine, narcotine and papaverine have important therapeutic value.

A severe mosaic disease was observed on opium

poppy plants, in the experimental fields of the Central Institute of Medicinal and Aromatic Plants, Lucknow. The affected plants exhibited mosaic, puckering symptoms on the leaves. Plants were stunted, and produced small flower buds with mottling symptoms on pedicel and sepals. The capsules were distorted. Severe infection of young plants often resulted in premature death of the plants.

For mechanical transmission experiments, the sap was extracted from the infected leaves in 0.1 M phosphate buffer, pH 7.0, containing 0.1% 2-mercaptoethanol and gently rubbed on healthy young leaves of test plants previously dusted with Carborundum (600 mesh).

Aphids (*Myzus persicae* Sulz.) were used in insect transmission tests. Virus-free insects were fed on infected *P. somniferum* plants for 24 h. After fasting them for 4 h the aphids were transferred to two sets of healthy one-and-a-half-month-old poppy plants. Twenty-four hours later, 0.03% rogor was sprayed



Figures 1 and 2. 1, Healthy and mosaic virus-infected poppy leaves. 2, Flexuous filamentous virus particles in leaf-dip preparation.

to kill the aphids in one set. From the other set of the plants aphids were transferred to another set of healthy plants. This process was repeated for 10 days to test for non-persistent or persistent virus transmission.

Seventy per cent of mechanically inoculated opium poppy plants showed mosaic symptoms 9–10 days after inoculation (figure 1) and veinal necrosis after 18–20 days, which led to premature death of the plants. Only 5% of the plants inoculated by insect transmission exhibited symptoms of the disease, and the virus transmission was non-persistent^{1–3}.

Host range of the virus was very limited. However, *Sonchus asper* L. and *Argemone mexicana* L. showed severe systemic symptoms after inoculation. *Chenopodium amaranticolor* Coste & Reyn and *C. quinoa* Willd. produced pale chlorotic lesions 5 days after inoculation. Thermal inactivation point of the virus was 50–55°C; the virus retained infectivity for up to 50 h at 30–35°C and showed pathogenicity at dilutions up to 10⁻³.

Electron microscopic examination of leaf-dip preparations revealed that the virus is a flexible rod, about 765 nm long. Infected cells exhibited numerous scrolls and a few pin-wheel inclusion bodies. Turnip mosaic virus, a member of the potyvirus group, has been reported on opium poppy from Hungary². Bean yellow mosaic virus has also been reported to naturally infect opium poppy in Bulgaria⁴. A strain of turnip mosaic virus causing mosaic disease of radish has, however, been reported to be mechanically transmitted to poppy⁵. A viral disease of opium poppy has also been reported to be caused by a spherical virus¹. The present virus differs significantly in particle morphology⁶, biological properties and symptomatology⁷ from the above reports^{1,7}. On the basis of host range, biological properties, insect transmission and electron microscopic studies, the present isolate appears to be a member of the potyvirus group. A perusal of the literature indicates that this is the first report of occurrence of a potyvirus on opium poppy in India^{7,9}.

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RAPID EFFECTS OF LEAD ON WATER HYACINTH (*EICHHORNIA CRASSIPES* SOLMS) PLANTS FOLLOWING SINGLE EXPOSURE DETECTED BY PHOTOACOUSTIC SPECTROSCOPY

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LEAD is a biologically nonessential metal. It is well known for its toxicity to plants and animals^{1,2}. Even 10 ppm of lead in solution can stop root growth completely in certain plants³. It inhibits the activity of many enzymes that have key roles in cellular metabolism and in biosynthesis of some important compounds such as haem and chlorophyll^{1,2,4}. Incubation of *Anacystis nidulans* thylakoids with Pb²⁺ (0.5 mM) for 30 min at 4°C removes 60% of the Mn pool. Only 0.5 mM of Pb²⁺ reduces oxygen evolution to zero⁵. Many sources of lead are responsible for contamination of the environment. Lead mining, industrial use of lead and combustion of petrol containing lead additives are the main causes of lead pollution. Urban areas and rural areas near major roads are more likely to be subjected to contamination by these sources. Plants growing in these places are highly exposed to lead, which gets deposited in various plant tissues and becomes a

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