Occurrence of crown gall caused by *Agrobacterium tumefaciens* on rose

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*Agrobacterium tumefaciens* (Smith and Townsend) Conn., the causal organism of crown gall, has a very wide host range and affects many woody and herbaceous plants belonging to 140 genera of more than 60 families (1). The disease causes heavy loss on stone fruits and rose plants, which ultimately leads to the death of the plants. High incidence of crown gall (18-25%) has been observed on *Rosa hybrida* L. cv. Bordo (Fig. 1) grown under poly-house conditions at village Tikri, tehsil Kandaghat, district Solan, Himachal Pradesh in August, 2012. During the year 2011-12, the incidence of crown gall on the same plant material was only 1 to 2 per cent. Therefore, the present investigations were carried out to observe symptoms and confirm the causal organism of crown gall on rose and its population density in the rhizosphere soil of infected plants.

Symptoms, i.e., presence and type of galls on infected *R. hybrida* L. cv. Bordo plants were observed. The colonies of *Agrobacterium* from galls, developed on infected plants and rhizosphere soil of rose cv. Bordo, were isolated on D1 medium (4). Individual colonies were streaked and re-streaked on the same medium to obtain pure colonies of the pathogen. The morphology of individual colonies was confirmed with the help of a reference strain *A. tumefaciens* strain C58. These individual colonies were further transferred to yeast extract mannitol agar slants and were stored at 4°C in a refrigerator for further work, viz. pathogenicity test on indicator plants, and for their 3-ketolactose production and other biochemical tests (2).

The incidence of crown gall observed during 2012-13 was 18 to 25 per cent, whereas its incidence during 2011-12 was only 1 to 2 per cent. This indicates slow build-up of crown gall pathogen. Characteristic symptoms, i.e., presence of galls ranging from 1.5 to 2.5 cm in diameter on crown portion and aerial parts of adjoining stem of infected plants were observed (Fig. 1). These galls were initially soft and later became woody. Individual galls were examined for the presence of connective plant tissues attached to galls and it was found that each gall was connected to the plant through a bridge made up of plant tissues. The crown gall pathogen, isolated from galls and also from rhizosphere soil of infected plants on *Agrobacterium* specific medium D1. Typical squishy-squashy and convex shaped yellowish brown colonies developed on this specific medium. The colonies isolated from galls were flat (Fig. 2) as compared to raise colonies, isolated from rhizosphere soil of crown gall infected rose plants (Fig. 3). Population density of $98 \times 10^2$ cfu per gram of soil was observed in the rhizosphere soil of infected plants (Fig. 3). Artificial inoculation of stem portions of tobacco plants with *A. tumefaciens* both from galls and rhizosphere soil resulted in development of typical galls (Fig. 4). Individual isolate(s) both from galls and soil, when subjected to 3-ketolactose test for their preliminary biovar characterization reveals that all these isolates were +ve.
The isolates showed alkaline reaction with litmus milk, no acid production from erythritol, positive oxidase reaction and utilisation of ferric ammonium citrate. On the basis of these biochemical characters, the crown gall pathogen of rose was characterized as biovar-1. Jalali and Pal (3) also reported the occurrence of crown gall on exotic rose plants obtained from Gurgaon (Haryana). Investigations were also carried out to check the menace of crown gall in poly-houses in village Tikri and surrounding areas and no further incidence of crown gall has been observed in the year 2013 and 2014. Farmer also changed the cv. of rose and now growing Rosa hybrida cv. Top Secret and now no incidence of crown gall has been observed.

REFERENCES


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