Occurrence and Distribution of *Iris yellow spot virus* on Onion in Mauritius

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Onion (*Allium cepa*) is a crop of economic importance in Mauritius with an annual production of 6000 tonnes over an area of 230 ha. In June 2008, diamond-shaped lesions were observed for the first time on onion leaves in Reduit on the experimental onion Line L6, and in La Chaumière on the commercial variety Nun7272. *Iris yellow spot virus* (IYSV) (genus *Tospovirus*, family *Bunyaviridae*) was identified in these samples (2) suggesting increasing distribution of IYSV (1,3). A survey was subsequently conducted in major onion-growing localities from 2008 to 2010 to assess the occurrence and distribution of IYSV in bulb and seed onion crops in Mauritius (Fig 1).

During the survey, visual inspection was conducted to record symptomatology of IYSV in onion grown both for seed and bulb production. Fields were selected randomly and depending on the area under production, disease assessment covered all fields in the region. The inner and border rows of each field were inspected and symptomatic samples were collected for diagnosis. Fields that were inspected consisted of plants at different growth stages ranging from vegetative to seed production. Symptoms observed on bulb and seed production crops were irregular chlorotic or necrotic to characteristic diamond-shaped lesion on leaf and seed stalk (Figs. 2, 3, and 4) together with feeding damage caused by *Thrips tabaci*. Varieties surveyed were Locale Red, Veronique, Gandiole, Nun 7272, and Star 5517 in onion production zones of Belle Mare, Palmar, Trou d’eau douce, and La Chaumière. Fields for onion bulb production varied in size and consisted of plots of 0.21 to 0.84 ha, whereas seed production was in small parcels of 0.021 to 0.042 ha. In 2008, a total of 29.65 ha was surveyed and 120 samples of leaves from bulb fields; 35 onion scape samples and 60 onion bulbs were collected. In 2009, 10.15 ha was surveyed and 103 symptomatic samples of which 75 leaf samples, 28 scapes, and 68 onion bulbs were collected. In 2010, a survey was carried out in the east and south east regions where seed crops of variety Locale Red were grown. The survey covered 2.2 ha across 33 fields.
Fig. 1. Map of Mauritius showing localities where IYSV was detected.
Samples were tested for the presence of IYSV and *Tomato spotted wilt virus* (TSWV) by enzyme-linked immunosorbent assay (DAS-ELISA) using commercially available kits (Agdia Inc., Elkhart, IN, USA). RT-PCR was used as another diagnostic tool for detection of IYSV in symptomatic samples. Total RNA was extracted and subjected to RT-PCR using primers derived from the small RNA of IYSV (4).

The highest incidence of IYSV on bulb onion crops in 2008 was observed at La Ferme, La Chaumière, Belle Mare, Trou d'eau Douce, Palmar, Riambel, and Bel Ombre. The main varieties grown were Locale red, Véronique, Nun7272, and Gandiole. Incidence in individual fields varied and ranged from 5% to 80%, with a severity of 50% to 75% leaf area infected. DAS-ELISA showed that 105 out of 120 (87.5%) samples collected were positive to IYSV. In Quatre Soeurs, Grand Sables, and Petit Sables, IYSV was detected in scapes with 35 out of 35 symptomatic samples testing positive for IYSV using DAS-ELISA. Severity on scapes ranged from 5% to 75% damaged leaf area. Lodging of scapes was observed in all the infected seed production plots with an incidence of 5% to 35%. No IYSV was detected in onion bulbs collected from symptomatic plants. The virus was not detected in Lamarie, Henrietta, and Plaine Sophie.

During 2009, incidence ranged from 20% to 75% with a severity of 10% to 50% leaf area infected. Fifty five out of 75 (73.3%) leaf samples and 22 out of 28 (78.6 %) scape samples were positive by ELISA. The disease was prevalent in the east/southeast, south and west on Locale red and Véronique.

In 2010, in the seed production fields surveyed, incidence ranged from 10 to 60% while severity ranged from 2% (few irregular/diamond shaped lesions) to 75% damaged leaf area (leaf blight) causing lodging of scapes. Thrips vector *Thrips tabaci* were observed in fields surveyed. Twenty out of 20 scape samples collected were positive for IYSV.
TSWV was not detected in symptomatic samples collected from 2008 to 2010 suggesting that infection was solely by IYSV. Sequence analysis on symptomatic samples showed that the N gene of the IYSV isolates from Mauritius (GenBank no. HM218822) shared 99% nucleotide sequence identity (99%) with two known IYSV N gene sequences (FJ785835, AM900393) available in the GenBank.

The high incidence and severity of IYSV recorded in bulb and seed onion crops during the surveys suggest that the virus can be a threat to onion production in Mauritius if not managed. Further research planned includes screening onion germplasm for resistance to the disease.

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