

SHORT COMMUNICATIONS

Plant Quarantine Measures to Prevent Nematode Spread among South Asian Countries

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On an average 60 to 70 thousand samples of various agri-horticultural crops in the form of true (orthodox) seeds, vegetative propagules (rooted cuttings, underground plant parts like rhizomes, tubers, bulbs, suckers and tissue cultured materials) are imported, into India for research purposes. Each sample is processed for detection of nematodes using general as well as specialized nematological techniques.

Information on the interception of nematodes along with germplasm under exchange, plant parasitic nematodes of quarantine significance, in the region, was compiled and analyzed for risk involved in the exchange of seed and planting material for the countries (Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka) of the South Asian Region. Among the 116 highly pathogenic plant parasitic nematodes known around the world, so far only 55 are recorded from the region. Out of nematode data recorded, 53 species are reported from India, 22 from Sri Lanka, 15 from Bangladesh, 7 from Nepal and one species each from Bhutan and Maldives. Several species that are reported from India are either not known to occur in other countries of the region or might be present but not surveyed and studied yet. Under the prevailing circumstances and similar climatic conditions, quarantine measures to prevent the spread within the region, of nematode pests like *Anguina tritici*, *Aphelenchoides fragariae*, *A. ritzemabosi*, *Ditylenchus angustus*, *Globodera pallida*, *G. rostochiensis*, *Radopholus similis* and *Tylenchulus semipenetrans* are suggested.

The nematode species not known to occur in the region viz., *Aphelenchoides arachidis*, *Belonolaimus longicaudatus*, *Bursaphelenchus xylophilus*, *Ditylenchus dipsaci*, *Globodera tabacum*, *Heterodera glycines*, *H. schachtii*, *Hoplolaimus pararobustus*, *Meloidogyne coffeicola*, *Nacobbus aberrans*, *Pratylenchus neglectus*, *Punctodera punctata*, *Radopholus citri*, *Rhadinaphelenchus cocophilus*, *Rotylenchus robustus*,

Trichodorus similes and *Xiphinema diversicaudatum* are of greater quarantine interest and need to be handled with highest caution. The listed nematodes require joint regulations and measures to maintain the status quo. To prevent crop losses and nematode pest multiplication, demarcation of clean areas and further all exchanges of seeds/ planting material from clean areas are emphasized.

The quarantine significance of vegetative propagules is highlighted by the fact that almost all underground plant parts exchanged (if not treated suitably with nematocide at the port of export) have been observed to carry several species of nematodes (Rajan and Arjun Lal, 2004). The nematodes tend to survive under the moist and cool packing conditions of air transport. The observations have been more so where some soil has also been transported along with the material (Mathur *et al.*, 1981). The true seed borne, white tip nematode (*Aphelenchoides besseyi*) has been intercepted repeatedly from *Oryza sativa* as it has spread world wide along with the seeds (Mathur and Lal, 1989).

The association of nematodes with the true seeds and foliage is poorly investigated as routine studies in most Nematology are confined to extraction of nematodes from soil or from roots. Two hosts (*Fraxinus americana* and *Stylosanthes hamata*) have been recorded as new hosts, that too from the true seeds (Gokte *et al.*, 1989; 1990). Seeds of graminacious crops and their wild relatives; foliage of imported plants should be given due attention as their examinations revealed presence of nematodes (Lal and Mathur, 1988 b).

In certain instances, previously unrecorded nematode species from the country of export (origin) was found to be associated with imported germplasm. For example, *Heterodera zaeae* was intercepted from rooted plants of *Vetiveria zizanioides* imported from the Republic of Tanzania (Lal and Mathur, 1988 a; Lal *et al.*, 1990). Similarly *Tylenchorhynchus neoclavicaudatus* was

intercepted from washings of potato tubers imported from USA (Mathur *et al.*, 1978) and *Polenchnus minutus* from palm plants imported from UK (Lal and Mathur, 1995). Interception of nematodes even from small quantities (a few grams of seed or a few days old rooted plants/bulbs etc) suggest that import of seeds/planting material in bulk for propagation need to be reviewed and suitably amended to prevent the introduction and spread of exotic nematodes.

All the interceptions listed are from the plant material accompanied with phytosanitary certificates from the quarantine authorities of countries of their export. Therefore there is an imperative need to strengthen quarantine facilities, rules and regulations to meet the growing challenge.

It is concluded that due to cumbersome nature of the nematodes and detection techniques involved, imports of plants and seeds of hosts from countries where the nematodes of quarantine importance occur, should be restricted to areas registered as the 'particular nematode free areas'. Stem cuttings should be preferred (for exchange) as compared to rooted cuttings or vegetative propagules. The exchange of tissue cultured planting materials is not always safe as the nematode contamination could also proliferate on cultured plant parts and may get exchanged.

Interception of plant parasitic nematodes and specially the one having wide host range and several races, in the imported consignments, emphasize the need to conduct a thorough and critical examination of all material under exchange. Adequate provisions are required for dealing with nematodes in plant quarantine regulations of each country of the region. Regulatory nematology

laboratories need to be established for detection, identification and generating data on nematode distribution. Need of facilities required for treatment of infested material should be taken with urgency.

References

- Gokte N, VK Mathur, A Lal and Rajan (1989) *Fraxinus americana* a new host record for *Aphelenchoides besseyi*. *Indian Journal of Nematology* **19**: 80
- Gokte N, VK Mathur, A Lal and Rajan (1990) On the occurrence of *Aphelenchoides besseyi* and some free living nematode species in *Stylosanthes hamata* seeds. *Nematologia Mediterranea* **20**: 63
- Lal A and VK Mathur (1988a) Plant parasitic nematodes intercepted from imported vegetatively propagated plant material. *Indian Journal of Mycology and Plant Pathology* **18**: 106
- Lal A and VK Mathur (1988b) Record of *Aphelenchoides besseyi* on *Setaria italica*. *Indian Journal of Nematology* **18**: 131
- Lal A. and VK Mathur (1995) Nematodes intercepted from imported plant material: Description of *Polenchnus minutus* n.sp. *Indian Journal of Nematology* **25**: 98-102
- Lal A., VK Mathur and Rajan (1990) Identification of *Heterodera zaeae* on vetiver plants imported from United Republic of Tanzania and variations observed. *FAO Plant Protection Bulletin* **39**: 44
- Mathur VK and A Lal (1989) A simple technique for detection of white tip nematode (*Aphelenchoides besseyi*) in rice germplasm under exchange. *Indian Journal of Nematology* **19**: 71
- Mathur VK, KC Sanwal and A Lal (1978) *Tylenchorhynchus neoclavicaudatus* n.sp. (Nematoda: Tylenchorhynchinae) in soil washings from imported potato tubers. *Indian Journal of Nematology* **8**: 148-150
- Mathur VK, KC Sanwal, RV Singh and A Lal. (1981) Role of soil clods and plant debris mixed with true seed in dissemination of plant parasitic nematodes. *Indian Journal of Nematology* **11**: 92-94
- Rajan and A Lal (2004) Interception of nematodes with quarantine significance. *Annals of Plant Protection Sciences* **12**: 397-402

***Fusarium solani* (Mart.) Sacc. Intercepted in Introduced Germplasm during Last Twenty-five Years**

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The international collaboration and free exchange of germplasm for utilization in crop improvement has played a key role in achieving self-sufficiency in the

food production. However, this exchange has been responsible for spread of many seed-borne pathogens to newer areas. In order to prevent the entry of new