Pest Risk Analysis (PRA) of Onion and Garlic in Bangladesh
Pest Risk Analysis (PRA) of Coconut in Bangladesh

Development Technical Consultants Pvt. Ltd (DTCL)

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EXECUTIVE SUMMARY

The study “Pest Risk Analysis (PRA) of Onion and Garlic in Bangladesh” documents the pests of onion and garlic available in Bangladesh and the risks associated with the import pathway of onion and garlic from the exporting countries namely India, China, Thailand, Myanmar, Japan, Indonesia, and any other exporting countries of the world into Bangladesh.

The findings evidenced that the 36 pests of onion and garlic were recorded in Bangladesh, of which 7 insect pests; 1 mite pest; 16 diseases causing pathogens among which 10 diseases were caused by fungi, 2 caused by bacteria, 3 caused by nematode and 1 diseases of onion and garlic was caused by virus and 12 weeds. The insect pests of onion and garlic reported were black cutworm (Agrotis ipsilon), onion thrips (Thrips tabaci), chilli thrips (Scirtothrips dorsalis), melon thrips (Thrips palmi), lesser armyworm (Spodoptera exigua), wireworm (Melanotus communis) and aphid (Tetranychus urticae). The mite pest of onion and garlic recorded in Bangladesh was two spotted spider mite (Tetranychus urticae). Among these insect pests of onion and garlic, thrips was the more damaging than other arthropod pests. The thrips was designated as major pest of onion and garlic and caused damage with high infestation intensity. The pest status of all other insect pests was minor significance and caused low level of infestation.

A total number of 17 species of disease causing pathogens for onion and garlic were reported in Bangladesh, among which 10 diseases were caused by fungi, 2 caused by bacteria, 3 caused by nematode and 1 diseases was caused by virus. The incidences of fungal diseases of onion and garlic reported in Bangladesh were purple blotch complex (Alternaria porri and Stemphylium vesicarium), black mould of onion (Aspergillus niger), grey mould-rot (Botryotinia fuckeliana and Botrytis aclada), leaf spot (Colletotrichum dematium), anthracnose (Glomerella cingulata), charcoal rot (Macrophomina phaseolina), cottony soft rot (Sclerotinia sclerotiorum), basal rot (Fusarium oxysporum) and rust of onion (Puccinia allii). Whereas, the incidences of bacterial diseases of onion and garlic recorded in Bangladesh were bacterial root rot (Pectobacterium carotovorum subsp. Carotovorum) and bacterial canker or blast (Pseudomonas syringae pv. syringae). The nemic diseases of onion and garlic were common spiral nematode (Helicotylenchus dihystera), Longidorids (Longidorus Micoletzky) and root rot nematode (Meloidogyne Spp.). The viral diseases of onion and garlic reported in Bangladesh were Leek yellow stripe potyvirus (LYSP). Among these diseases, the purple blotch of onion and garlic, black mould of onion and root rot were more damaging than others. While other diseases were reported as minor diseases of onion and garlic and caused damage with low infection intensity in Bangladesh.

A total number of 12 weeds were reported as the problems in the field of onion were in Bangladesh. In onion and garlic as reported was common chamomile (Chamomilla recutita), bermuda grass (Cynodon dactylon), barnyard grass (Echinochloa crus-galli), goose grass (Eleusine indica), hogweed (Polygonum aviculare), green foxtail (Setaria viridis), black nightshade (Solanum nigrum), and parthenium weed (Parthenium hysterophorus). The parthenium weed (Parthenium hysterophorus) was recorded and found in some restricted areas of Bangladesh such as Rajshahi, Natore, Pabna, Kustia, Jessore districts. These districts are nearly attached with the western border of Bangladesh and eastern border of West Bengal of India. It was also reported that the Parthenium weed might be entered into Bangladesh through cross boundary pathway from India by the transportation system of border trading. As a newly introduced weed, though Parthenium caused damage with low infestation intensity, but it
could cause severe damage and spread to other areas, if not controlled properly. Other eleven weeds were reported as minor weeds with low infestation intensity in onion and garlic fields.

Information on pests associated with onion and garlic in the exporting countries—India, China, Japan, Thailand, Taiwan, Vietnam, Philippines, Indonesia, U.S.A, Australia, France, Germany, Italy, Netherlands, Belgium, Brazil and Chile—revealed that pests of quarantine importance exist. The study that included 6 insect pests, 2 mite pests, 1 snail, 12 disease causing pathogens including 6 fungi, 2 bacteria, 1 nematode, and 3 viruses; and 1 weed. Without mitigation, these pests could be introduced into Bangladesh through importation of commercially produced onion and garlic. Pests of quarantine importance included insect pests namely the quarantine insect pests are Western flower thrips (*Frankliniella occidentalis*), pea leaf miner (*Liriomyza huidobrensis*), onion fly (*Delia antiqua*), serpentine leaf miner (*Liriomyza trifoli*), leek moth (*Acrolepiopsis assectella*) and vegetable weevil (*Listroderes costirostris*). The quarantine mite pests of onion and garlic for Bangladesh are dry bulb mite (*Aceria tulipae*), bulb mite (*Rhizoglyphus echinopus*). The quarantine snail of onion and garlic is common garden snail (*Cornu aspersum*). Twelve (12) disease causing pathogens have been identified as quarantine pests of onion and garlic for Bangladesh. Among these, 6 quarantine fungi named neck rot of onion (*Botryotinia porri*), leaf blight of onion (*Botryotinia squamosa*), white rot (*Stromatinia cepivora*), onion smut (*Urocystis cepulae*), downy mildew of onion (*Peronospora destructor*) and pink root rot (*Pyrenochaeta terrestris*); 2 quarantine bacteria namely yellow disease phytoplasmas (*Candidatus Phytoplasma*) and crown gall (*Rhizobium radiobacter*); 1 species of nematode namely stubby root nematodes (*Trichodorus* spp); 3 viruses namely *Tomato black ring virus, Onion yellow dwarf, Iris yellow spot virus*. One species of quarantine weed has been identified for Bangladesh named Parthenium weed (*Parthenium hysterophorus*).

The consequences and potential/likelihood of introduction of each quarantine pest were assessed individually, and a risk rating estimated for each. The consequence and potential of introduction value was estimated assessing biology, host, distribution, hazard identification, risk assessment, consequence assessment, risk estimation and risk management of the pests: The two values were summed to estimate an overall Pest Risk Potential, which is an estimation of risk in the absence of mitigation.

Out of 23 quarantine pests associated with the pathway risk were assessed. Out of 22 potential hazard organisms, 17 hazard organisms were identified with high risk potential, 2 were moderate and 2 were low and 1 uncertain species was found which likely to be associated with host plants during importation from exporting countries, but *Pyrenochaeta terrestris* (pink root rot) remained as uncertain hazards due to lack of its detail information. These mean that these pests pose unacceptable phytosanitary risk to Bangladesh’s agriculture. Visual inspection at ports-of-entry for high risk potential pests is insufficient to safeguard Bangladesh’s spices industry and specific phytosanitary measures are strongly recommended. While for moderate risk potential pest, specific phytosanitary measures may be necessary to reduce pest risk.