

NATIONAL STANDARDS FOR PHYTOSANITARY MEASURES

NSPM: 26

Establishment of Pest Free Areas for Fruit Flies (Tephritidae)

2013

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1. Introduction

1.1 Scope

This standard provides guidelines for the establishment of pest free areas for fruit flies of economic importance, and for the maintenance of their pest free status. The target fruit fly pests for this standard include insects of the order Diptera, family Tephritidae. NSPM preparation based on guidelines and recommendations developed within the framework of the IPPC. This standard also adopted the principles, recommendations and format of ISPM to achieve international harmonization of phytosanitary measures with the aim to facilitate trade.

1.2 References

IPPC. 1997. International Plant Protection Convention. Rome, IPPC, FAO.

ISPM 4. 1995. Requirements for the establishment of pest free areas. Rome, IPPC, FAO.
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ISPM 5. Glossary of phytosanitary terms. Rome, IPPC, FAO.

ISPM 6. 1997. Guidelines for surveillance. Rome, IPPC, FAO.

ISPM 8. 1998. Determination of pest status in an area. Rome, IPPC, FAO.

ISPM 9. 1998. Guidelines for pest eradication programmes. Rome, IPPC, FAO.

ISPM 10. 1999. Requirements for the establishment of pest free places of production and pest free production sites. Rome, IPPC, FAO.

ISPM 17. 2002. Pest reporting. Rome, IPPC, FAO.

RSPM. 2005. Requirements for the establishment and maintenance of pest free areas for tephritid fruit flies, Rap publication 2005/26

Operations Manual for Import and Export Certification, FAO/TCP/NEP/2903 -A Strengthening of Plant Quarantine Facilities in Nepal, 2005)

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ISPM 26, 2006. Establishment of Pest Free Areas for Fruit Flies (Tephritidae). . Rome, IPPC, FAO.

R. Sapkota, K. C. Dahal and R. B. Thapa, 2010-Damage assessment and management of cucurbit fruit flies in spring-summer squash

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Integrated management of fruit fly (*Bactrocera cucurbitae*) on bitter melon during the summer of 1998/99. IAAS Research Reports (1995-2000): 171-175 (2000).

National Standard on Internal Quarantine of Major Exportable and Consumable Commodities.
BPRC Pvt. Ltd. 2011

Introduction and importance of Pest Free Area and requirements for declaration of free area,
MTF/NEP/060/STF/STDF-170, Government of Nepal, MoAD/DoA, WTO and FAO, July, 2010).

Plant Protection Act, 2007 and Rules, 2010

Definitions

Pest Free Area is defined in the International Standard for Phytosanitary Measures No. 5 (Glossary of phytosanitary terms) (ISPM 5, 2010) as “An area in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained” [FAO, 1995]

1.3 Outline of requirements

This standard provides procedures for establishment, maintenance, and verification of Pest Free Areas (PFA) for fruit flies. The standard outlines measures to reduce the risk of introduction and spread of the pest, criteria for monitoring fruit flies, regulatory controls (quarantine operations), and corrective action plans. The procedures necessary for suspension, termination, and reinstatement of the PFA are also included. A bilateral work plan may be required to elaborate on the issues described in this standard. Corrective action planning is described in **Annex 1**.

The general requirements to be considered in the establishment of a fruit fly pest free area (FF-PFA) include: consideration of the need for a buffer zone; preparation of a public awareness programme; identification of resources; administrative elements of the system (development of documentation and review systems, record keeping and quality assurance programme) and supervision activities.

The major elements of the FF-PFA are: establishment of the FF-PFA; verification and declaration of the FF-PFA; and maintenance of the FF-PFA. These elements include the surveillance operational activities of trapping and fruit sampling, confirmatory identification of any fruit fly species detected. Guidance on trapping procedures, fruit sampling activities and preparation and dispatch of fruit fly larvae for identification is provided in Appendixes 1, 2 and 3.

2. Background

The establishment and use of a PFA by an NPPO provides for the export of plants, plant products and other regulated articles from the country in which the area is situated (exporting country) to another country (importing country) without the need for application of additional phytosanitary measures when certain requirements are met. Thus, the pest free status of an area may be used as the basis for the phytosanitary certification of plants, plant products and other regulated articles with respect to the stated pest(s). It also provides, as an element in pest risk assessment, the confirmation on a scientific basis of the absence of a stated pest from an area. The PFA is then an element in the justification of phytosanitary measures taken by an importing country to protect an endangered area

Fruit flies (Diptera: Tephritidae) are economically important pests that often require the application of phytosanitary measures for movement of host commodities in trade because they cause

damage and restrict market access for fruits. The presence of species of the family Tephritidae not only has a negative impact on economy of infested countries, but also has implication on the international trade due to the restrictions imposed by the importing countries on the export of fresh fruit. For these reasons, there is a need for Nepal's NSPM that provides specific guidance for the establishment and maintenance of pest free areas for fruit flies. A detection of fruit fly within the PFA can result in the loss of lucrative export markets and the introduction of expensive control programs which affect the local fruit and our communities.

A fruit fly outbreak detected in a fruit fly-pest free area (FF-PFA) may pose a risk for those importing countries where the fruit fly species is considered a regulated pest. Phytosanitary actions for quarantine purposes are needed because movements of regulated articles from and through quarantine areas pose a risk of spreading the target fruit fly species. When a fruit fly outbreak is detected within an FF-PFA, a quarantine area should be established. The NPPO of the exporting country should determine the criteria for the declaration of an outbreak in accordance with this standard and other relevant ISPMs. The ISPM concerning fruit flies have facilitated the exporting and importing countries to find solution for fresh fruit trading. ISPM 4:1995 describes different types of pest free areas and provides general guidance on the establishment of pest free areas.

The quarantine area and the related phytosanitary actions are necessary to maintain the status of the surrounding FF-PFA and to meet the requirements of the importing country. These phytosanitary measures may be subject to bilateral agreement. They may also be audited by the national plant protection organization (NPPO) of the importing country. One of the functions of NPPO of Nepal is to carry out regular study, research and surveillance of regulated pests, and update information thereon and provide such information to the concerned bodies or importing countries (See Plant Protection Regulation, 2010). It is also considered that exporting country should use standard traps, specific lures and harmonized trapping procedures and proper documentation of records to ensure the fruit fly free area status is maintained so as to comply with the requirements of importing country.

The target pests for which this standard was developed include insects of the order Diptera, family Tephritidae, of the genera Anastrepha, Bactrocera, Ceratitis, Dacus, Rhagoletis and Toxotrypana.

3. Requirements

3.1 General requirements

Fruit fly pest free areas may occur naturally or following the successful implementation of pest eradication programmes (ISPM No. 9: Pest Eradication programmes). According to ISPM No. 10, a pest free area is managed as a whole, by the NPPO of the exporting country. The decision to establish a FF-PFA is made by NPPO based on technical and socio-economic feasibility. Technical factors to consider in determining the feasibility of establishing a FF-PFA in a country may include components such as: pest biology, size of the area, pest population levels, dispersed pathways, geographic isolation, climate, geography and availability and feasibility of methods for pest eradication. All the procedures used for establishment and maintenance of the FF-PFA should be documented, audited and endorsed by the NPPO. The NPPO of the exporting country should, on request, make available to the NPPO of the importing country the rationale for establishment and maintenance of pest free areas.

In areas where the fruit flies are capable of establishment and known to be absent, general surveillance in accordance with section 3.1.2 of ISPM 8:1998 is normally sufficient for the purpose

of delimiting and establishing a pest free area. If, however, the fruit flies are detected and can cause economic damage during a season (Article VII.3 of the IPPC), corrective actions should be applied in order to allow the maintenance of a FF-PFA.

3.1.1 Public awareness

A public awareness programme is most important in areas where the risk of introduction is higher. An important factor in the establishment and maintenance of FF-PFAs is the support and participation of the people living within the FF-PFA, individuals that may travel to or through the area, and other parties with interests in the area. The FF-PFA status can be maintained only if there is no introduction of target species through the movement of infested fruit. The public and stakeholders should be informed of the importance of establishing and maintaining the pest free status of the area. This awareness may include information on exotic species of quarantine concern. Public awareness is conducted by different ways or sources including:

- permanent or temporary checkpoints in selected areas
- posting signs at entry points and transit corridors
- fruit fly host commodity disposal bins at the borders of FF-PFAs or buffer zones,
- awareness brochures, leaflets, posters with information on the pest and the pest free area
- Publications in medias (newspaper, TV, Radio)
- Public information campaigns through extension officers
- Educational programs at Universities and public seminars
- systems to regulate fruit movement/ systems to allow certified fruit fly free fruit movement within the FF-PFA-internal
- non-commercial hosts
- security of the traps
- penalties for non-compliance

3.1.2 Documentation of information

The information on detailed occurrence and distribution of various fruit fly species in Nepal and their host range should be clearly documented based on the literature search and as verified by the specimens deposited with the national insect collection maintained by the Division of Entomology, Nepal Agriculture Research Council (NARC), Natural History Museum of Tribhuvan University or any other authenticated insect collection and pest records. All procedures used in the establishment and maintenance of a FF-PFA should be adequately documented. The procedures should be reviewed and updated regularly. Any corrective measures implemented to refine or re-establish a FF-PFA should also be documented. They should be reviewed and updated regularly, including corrective actions, if required (see also ISPM 4:1995).

3.1.3 Record keeping

The Plant Protection Directorate (NPPO) of Nepal or other institute/organization authorized by NPPO should keep appropriate records derived from general surveillance and specific surveys. Information kept should be appropriate for the intended purpose, for example support of specific pest risk analyses, establishment of pest free areas and preparation of pest lists. The pest records should be maintained as per the format given in Table 1, 2, 3 and 4.

Records of all procedures (such as surveys, detections, occurrences or outbreaks and results of other operational procedures) undertaken in the establishment and maintenance of a FF-PFA should be retained for as long as possible. Such records should be made available to the NPPO of the importing country on request.

3.1.4 Supervision activities

Directorate of Plant protection (PPD), established under Department of Agriculture/Ministry of Agriculture Development, being the National Plant Protection Organization has the overall responsibility for organizing survey and monitoring programmes for determination of pest free areas (PFAs) in association with the NARC. The FF-PFA programme, including the surveillance procedures (both trapping and fruit sampling when used), regulatory control, and corrective actions should comply with the documented and approved procedures.

The effectiveness of the programme should be monitored by the NPPO and/or trading partner, as appropriate, using quality assurance procedures. The NPPO of Nepal should ensure that the overseas country requirements are met with by ensuring the day to day running of the regular fruit fly monitoring programme and also responsible for timely reporting the survey results and take immediate necessary action in the event of detection of any fruit flies. The PPD of Department of Agriculture in close technical collaboration of NARC should operate permanent trapping grids in the designated PFAs. They should ensure proper inspection of traps is carried out at regular intervals as required, recharging/replacement of traps as considered necessary at specified intervals, collection and forwarding of specimens to reference entomologist for identification, timely reporting of the activities and effective implementation of appropriate measures following the detection of fruit flies of concern.

The NPPO should evaluate and audit the operation of the procedures for establishment and maintenance of the FF-PFA to ensure that effective management is maintained even where the responsibility to carry out specific activities has been delegated to outside the NPPO.

4 Specific requirements

4.1 Determination of the FF-PFA

The following characteristics of a FF-PFA should be considered in the determination of a specific area:

- target fruit fly species and their distribution within the country;
- commercial and non-commercial host species
- geographical area (detailed maps showing the boundaries, natural barriers, entry points and host locations in the area)
- any existing regulations which may affect fruit movement
- climatic data (rainfall, relative humidity and temperature)
- buffer zones (where necessary)

Further guidance on establishing and describing a PFA is provided in ISPM 4

4.2 Establishment of the FF-PFA

The establishment of the FF-PFA will be based on presence of target pests in the area, pest level, numbers and damage. Information required includes, but is not limited to, general surveillance and specific surveys (detection, delimiting, and monitoring). The NPPO is responsible for the surveys, inspections and other systems that verify pest establishment and freedom. The survey data should be submitted in details and should follow the guidelines of good surveillance (See introduction and importance of Pest Free Area and requirements for declaration of free area,

MTF/NEP/060/STF/STDF-170, Government of Nepal, MoAD/DoA, WTO and FAO, July, 2010). The data should include the qualification of the personnel involved, appropriate facilities, equipments and instruments, effective and scientifically-valid methodology, expertise in diagnostic and identification services as well as organizational systems of the services, etc. The NPPO of Nepal country should provide official survey data. However, the following should be developed and implemented:

- surveillance activities for establishment of the FF-PFA
- delimitation of the FF-PFA
- phytosanitary measures related to movement of host material or regulated articles
- pest suppression and eradication techniques as appropriate

4.2.1 Buffer zone

In areas where geographic isolation is not considered adequate to prevent reinfestation of a FF-PFA or where there are no other means of preventing fruit fly movement to the FF-PFA, a buffer zone will need to be established. Some of the factors which should be considered in the establishment of a buffer zone include:

- pest suppression techniques which may be used to reduce the fruit fly population including:
 - selective insecticide bait spraying, sterile insect techniques, male annihilation (destruction) technique, biological control, mechanical control;
 - the target fruit fly species and its biology, host availability, cropping systems, natural vegetation including adjacent forest or natural ecosystems, climatic conditions;
 - the geographic features of the area under consideration; and
 - the proximity of large urban areas that may make the control of fruit fly species of economic concern difficult and/or costly.

4.2.2 Surveillance activities prior to establishment

A regular survey programme for fruit flies of economic concern should be established and implemented. Generally it is considered that trapping, using an established trapping network throughout the FF-PFA, is sufficient to determine fruit fly absence or presence in an area.

For species that are non-responsive to specific pheromone lures, fruit sampling may be used during the establishment phase of a FF-PFA. However, non-pheromone lure based traps (i.e. food-based traps) are generally used for large scale monitoring of FF-PFAs where non-pheromone lure responsive fruit flies are to be monitored.

Surveillance should be undertaken for at least 12 months in the FF-PFA, or a period agreed to by consultation with prospective trading partners, using specific trapping and fruit sampling procedures throughout the potential FF-PFA. Trapping and sampling procedures should be applied to both commercial and non-commercial host material. These procedures are used to demonstrate that the pest is not present in the potential FF-PFA. There should be no detections (adult or immature stages) of the target species during the survey period. Trapping and/or fruit

sampling techniques adopted should follow established protocols for the target species of concern. Surveys should be conducted using the guidelines in **Appendixes 1 and 2**.

4.2.2.1 Trapping procedures

Pest detection is an important step in the pest prevention program. Accurate recognition of newly introduced, economically significant insects in the field enables the prompt implementation of steps to effectively and efficiently confine and eradicate new infestations to prevent establishment and subsequent spread of these pests to agricultural.

Effective insect pest management relies on the early detection of insect pests, hopefully before they become established and cause damage. Trapping helps indicate the best possible time to spray for maximum effectiveness. This section contains general information on trapping procedures. There are long-established trapping systems that have been used to survey fruit fly populations. Trapping conditions may vary depending on, for example, the target fruit fly and environmental conditions. Fruitfly monitoring by these traps is a cheap, simple and efficient method. More information is provided in **Appendix 1**. When planning for trapping, the following should be considered.

Trap types and lures

The various trap/lure have been developed for survey and monitoring specific fruit flies. The traps used in Nepal include: cuellure and Sex pheromones and aggregating pheromones (brought together into a mass). Fly catches differ depending on the types of lure used. The type of trap chosen for a survey depends on the target fruit fly species and the nature of the attractant.

Use of methyl-eugenol trap or cuellure trap was found very effective in controlling fruit fly and farmers were very much impressed with this technology and were enthusiastic to use this technology (See Jaiswal, J. P., Gurung, T. B., GC., Y. D. and Pandey, R. R. (1997). Findings of melon fruit fly control survey and its integrated management, 1996/97. LARC Working Paper No. 97/53. Kaski, Nepal: Lumle Agricultural Research Centre).

Fruit flies are among the major pests of curcubitaceous vegetables and citrus fruits such as mandarin and lemon. The pest management programme which included the farmers awareness, male annihilation by using parapheromones (cue lure for *Bactrocera cucurbitae* and methyl eugenol for *B. dorsalis*) and field sanitation have received tremendous interest and support of the farmers and will be continued (see Pandey, R. R. GC., Y. D. and Vaidya, A. K. (1997). A Report on management of fruit fly survey of egg parasitoids of citrus green stink bug and monitoring of pests of rice and maize. LARC Working Paper No. 97/25. Kaski, Nepal: Lumle Agricultural Research Centre)

The use of pheromone trap and field sanitation were found to be very effective in suppressing fruit fly (*Bactrocera cucurbitae*) incidence (See also Integrated management of fruit fly (*Bactrocera cucurbitae*) on bitter gourd during the summer of 1998/99. IAAS Research Reports (1995-2000): 171-175 (2000).

Trapping density

Trap density (number of traps per unit area) is critical for fruit fly surveys. The densities need to be adjusted based on many factors including: trap efficiency, lure/attractant efficiency, and location regarding altitude, type and presence of host, climate, topography, programme phase and type of fruit fly species. The density of trapping would be higher for those areas with high probability of introduction.

Trap deployment (determination of the specific location of the traps)

In FF-PFA programmes an extensive trapping network should be deployed (spread out) over areas where host plants are found. The trapping network layout will depend on the characteristics of the area, host distribution and biology of the fruit fly of concern. One of the most important features of trap placement is selecting a proper trap location and trap site within the selected host tree. If low growing host plants (strawberries, cucurbits etc.) are to be monitored or the availability of suitable host trees is limited, traps should be placed as close as possible to the canopies of non-host shade trees or an artificial equivalent, 1-2 metres above the ground. Traps should not be hung below the foliage canopy of host trees, and should be a minimum of 1 metre above the ground. If more than one type of trap is deployed at a trapping site (e.g. two different lure traps), the traps should be separated by a minimum of 3 metres and should not be deployed in the same host tree.

Consideration should be given to commercial management practices in the area where host trees are selected. For example, the regular application of insecticides (and/or other chemicals) to selected host trees may have a false-negative effect on the trapping programme.

Trap servicing

The frequency of trap servicing (maintaining and refreshing the traps) during the period of trapping will be dependent on attractant persistency (i.e. longevity of the bait), the retention system if it affects the quality of specimens, rate of catch, season of fly activity, placement of traps, biology of the species and environmental conditions.

It is important that lure material does not contaminate the external surface of the trap, nearby soil or plant material. It is equally important to ensure that there is no cross-contamination between lure types, or between lures and other chemicals.

Trap replacement

Traps have a definite working life, and the replacement of traps should be undertaken periodically based on the expected longevity of the trap in the particular environment. The condition of each trap should also be examined during trap servicing and inspection activities, and where applicable (e.g. signs of deterioration), traps should be replaced.

Record keeping

All trapping and servicing data should be recorded. Records should be kept up-to-date and be readily available. The results of weekly trapping would be recorded in the workbook, which contain worksheets (Table-1). At the end of each year, a consolidated report should be forwarded detailing the survey, detection of outbreak of suspected fruit flies and the action taken (Table 3).

Trap inspection and monitoring

Traps should be inspected at weekly intervals during late spring, summer, and early autumn and at fortnightly intervals during winter. The frequency of regular inspection during the period of trapping should depend on:

- expected fruit fly activity (biology of the species)
- response of the target fruit fly in relation to host status at different times of the year
- relative number of target and non-target fruit flies expected to be caught in a trap
- type of trap used
- physical condition of the flies in the trap (and whether they can be identified).

In certain traps, specimens may degrade quickly making identification difficult or impossible unless the traps are checked frequently.

Identification capability

In the implementation of IPPC, the NPPO should have access to adequate infrastructure and trained personnel.

4.2.2.2 Fruit sampling procedures

Each samples that inspector or plant protection officer submits for laboratory analysis is considered to be an official sample. Fruit sampling may be used as a surveillance method in combination with trapping where trapping is less effective (APPENDIX 2). With fruit flies that are not responsive to traps, the following factors should be considered if fruit sampling is to be used as a surveillance method.

- All samples should be representative of the lot.
- Appropriate measures should be taken to ensure that samples are not compromised during its handling, storage and transport to the laboratory.
- If samples are improperly collected, mishandled, transported and/or are not representative of the sampled lot, the laboratory results may be inaccurate and inconclusive.

It should be noted that fruit sampling is particularly effective in small-scale delimiting surveys in an outbreak area. However, it is labor intensive, time consuming and expensive due to the destruction of fruit. Some of the larvae should also be collected and preserved as per Appendix-3 and immediately be dispatched to the Reference Entomologist.

Host preference

Fruit sampling should take into consideration the presence of hosts of the target species. Sample fruit should be targeted based on maturity and apparent signs of infestation in fruits and commercial practices (e.g. application of insecticides) in the area.

Targeting high risk areas

Fruit sampling should be targeted to areas likely to have presence of infested fruits such as urban areas, abandoned (go away from) orchards, rejected fruit at packing houses, fruit markets and sites with a high concentration of primary hosts and entrance points into the FF-PFA, where appropriate.

Sample size and selection

The inspector should obtain the correct sample number(s) from the appropriate sampling plan. All sample numbers have a unique identification name and code that identifies whether or not the sample is intended for monitoring, surveillance, compliance, or other inspection activities defined by the program. The size of the sample is indicated in the specifications for each sampling plan and depends on the laboratory tests to be performed.

Factors to be considered include:

- the required level of confidence
- the sample size, the number and weight of fruits per sample should be planned based on the availability of primary host material in the field.

Procedures for holding fruit

Fruit samples collected in the field should be brought to a facility for holding, fruit dissection, and pest recovery. Each sample must be labeled with the sample identification number, or any other information that will help to match the Sampling Report to the proper sample. The marking must be legible and permanent. Do not use a felt pen on plastic sample containers because the ink

might penetrate the container. Fruit should be transported and held in a secure manner to avoid mixing fruits from different samples.

4.2.3 Inspection in field during active growing season

If the importing country insists upon the inspection of the crop during pre-harvest time/ active growing period for the freedom of any specific pathogen, the same is also undertaken. The inspection is conducted at regular interval of 15 days to one month depending upon the crop/ commodity and pathogen (Operations Manual for Import and Export Certification, FAO/TCP/NEP/2903 -A Strengthening of Plant Quarantine Facilities in Nepal, 2005)

4.2.4 Regulatory controls on the movement of host material or regulated articles

Regulatory movement controls for regulated articles are required to prevent the entry of target pests into the FF-PFA. These controls will depend on the assessed risks (after identification of likely pathways and regulated articles) and may include:

- listing of the target fruit fly species on a quarantine pest list
- regulation of the pathways and articles that require control to maintain the FF-PFA
- domestic restrictions to control the movement of regulated articles into the FF-PFA
- inspection of regulated articles and examination of relevant documentation and, where necessary, application of appropriate non-compliance actions (e.g. treatment, reshipment or destruction).

4.2.5 Other technical information

Additional information may be useful during the establishment phase of FF-PFAs. This may include:

- Historical records of detection, population dynamics, and survey activities for the designated target pest(s) in the proposed PFA should be retained for at least 24 months.
- Records of the commercial production of host crops in the area, and an estimate of non-commercial production, and the presence of wild host arterial (road), should be retained.
- If detections of fruit flies have occurred in the proposed PFA during the establishment phase, the phytosanitary measures taken (e.g., delimiting trapping, fruit sampling, pest eradication techniques) and the results of those measures should be documented.
- An official list of the other target arthropod pest species that may be present in the proposed PFA should be established

4.2.6 Domestic declaration of pest freedom

Nepal's Plant Protection Act, 2007 chapter 5 (Provisions relating to control of pests) deals with pest free area declaration. The NPPO verifies the fruit fly free status of the area (see ISPM No. 8: Determination of pest status in an area) by checking the compliance with the procedures set up in accordance with this standard (surveillance and regulatory controls). The NPPO should declare the establishment of the FF-PFA and notify trading partners, as appropriate.

4.3 Maintenance of the FF-PFA

Following the establishment and declaration of a FF-PFA, this status should be maintained. The NPPO should continue to administer the following management and operational aspects associated with the FF-PFA

- Surveillance activities
- Regulatory controls/actions- listing of the pest on a quarantine pest list, specification of quarantine requirements for importation into the country or district, restriction of the

movement of certain plants or plant products within areas of the country, establishment of buffer zones and record of enforcement actions taken against violations.

- Movement Controls
- Routine monitoring
- Extension programs for training and educating producers to strengthen plant protection.
- Checks to verify freedom has been maintained
- Follow-up inspection and verification of pest free area
- Inspections of each consignment to be exported.
- Inspection and monitoring from researchers, inspectors and authorized personnel and reporting the results to the concerned agency
- Requirement for researchers, extension workers or inspectors to immediately notify the national plant quarantine authority of any occurrence of the pest.
- Monitoring survey
- Documentation and review

The aforementioned data and information of periodic review should be kept on file and, upon request, should be made available for review by the contracting party. If deemed necessary during the review process, the country may be requested to dispatch appropriate personnel for consultation. After review and evaluation are concluded, inspector(s) should be sent to the area in proper season to conduct on-site inspection for confirmation of pest free status. The expenses for inspection of the pest free status by the inspector(s) should be borne by the country.

NPPO undertakes pest risk analyses for the establishment of phytosanitary measures; manage pest surveillance; report to other countries on pest status; coordinate the control of pests; and establish and monitor pest free areas. So, the NPPO of Nepal should have the following data and information.

- Data and information for the establishment of PFA
- Description of the pest free area: Administrative information should include, but not be limited to, geographical location, boundary and size of the area, river or creek connecting with the area, record of flooding and dust storm, ecological conditions, degree of isolation, and other information which can support its area freedom status.
- Biology of the pest: information should include, but not be limited to, scientific name, taxonomy, biotype, criteria for diagnosis or identification, host range, life cycle, survival condition and potential, reproductive potential, means and distance of dispersal, sign or symptom of infestation or infection, damage potential and control measures, etc.
- Quarantine measures used to maintain status of the pest free area:
- Detailed Technical results of survey and surveillance

(See introduction and importance of Pest Free Area and requirements for declaration of free area, MTF/NEP/060/STF/STDF-170, Government of Nepal, MoAD/DoA, WTO and FAO, July, 2010).

4.3.1 Surveillance for maintenance of the FF-PFA

After verifying and declaring the FF-PFA, the official surveillance programme should be continued at a level assessed to be required for maintenance of the FF-PFA, for as long as the FF-PFA is operational (Table 2). Regular (for example monthly) technical reports of survey activities should be generated. This may be the same as for surveillance procedures during the establishment phase with differences in density and trap locations dependent upon the assessed level of risk of introduction and establishment of the target fruit fly species. It is likely that there will be lower densities required in commercial production sites and higher densities at points of entry and urban areas.

4.3.2 Movement Controls

The movement controls activities described in section 4.2.4 are required to be applied on an ongoing basis to maintain fruit fly pest free area status.

4.3.3 Verification of Fruit Fly pest free areas

The NPPO should verify that the requirements to maintain the PFA continue to be met. In addition to the surveillance activities and movement controls detailed in this standard, routine inspection and fruit sampling in the PFA should be carried out. The absence of reports of target pests on commodities moved out of the PFA can contribute to verification that the PFA is being maintained.

4.3.4 Planning for corrective action

The NPPO should have a documented plan of corrective actions to be implemented if the target pest is detected in the PFA. The corrective actions should be initiated within 48 hours of the identification of a target pest in the surveillance program or identification of an immature life stage in the fruit. Failure to implement corrective actions should result in termination of PFA status (see Annex 1). This plan should include:

- criteria for the declaration of an outbreak/incursion, and the determination of the outbreak area and suspension area/s within the FF-PFA;
- criteria for reinstatement of a FF-PFA suspension area following an outbreak;
- procedures for responding to post-harvest interceptions, including interceptions by trading partners in imported host material;
- criteria for initiating further surveillance;
- rapid identification of target fruit fly species;
- the rapid implementation of delimiting survey/s (trapping and fruit sampling);
- eradication measures; and
- notification of corrective actions to trading partners as appropriate.

4.4 Suspension, reinstatement or loss of a FF-PFA status

4.4.1 Suspension and termination

The status of the FF-PFA will change when an outbreak of the target pest occurs or procedures are found to be faulty. Confirmation of a reproducing population (e.g., fertilized female) of the target pest(s) in the PFA or detection of target pest(s) during inspection of host products (e.g., larvae or pupae) should result in immediate suspension of the PFA status.

If the criteria for an outbreak are met, this should result in the implementation of the corrective action plan as specified in this standard and immediate notification to importing country's NPPO (see NSPM : Pest reporting). The whole or part of the FF-PFA may be suspended or terminated or revoked. If control measures are not effective and the pest becomes established within an area

of the FF-PFA, the pest free status of the area, or of the infested area of the FF-PFA, should terminate. Failure to apply phytosanitary measures necessary to maintain the PFA may result in termination of the PFA status. Trading partner (importing country's NPPO) should be informed or notified of any change in FF-PFA status as soon as possible.

4.4.2 Reinstatement (recovery) of the pest free area status

The status of a fruit fly PFA should be suspended if there is an outbreak of the target pest or inadequate procedures to maintain the integrity of the PFA have been applied. This suspension would not be an automatic loss of PFA status, but only apply to the time that corrective action has been initiated. If the control measures have shown results and the target pest is no longer found or the procedures in question have been corrected, the fruit fly PFA could be reinstated. Reinstatement of suspended areas can take place with the following conditions:

- Following an outbreak, reinstatement criteria agreed to between trading partners have been met
- Following identification of non-compliance in implementing agreed procedures and appropriate corrective actions have been implemented to address the non-compliance
- The location details and emergency measures taken will be reported to the NPPO (Plant Protection Directorate of Department of Agriculture) for further communication to NPPO of importing country
- Such reinstatement of pest free status should be considered with the approval of NPPO of importing country

4.4.3 Loss of FF-PFA status

If the control measures are not effective and the pest becomes established in the whole area (the area recognized as pest free), the status of the fruit fly PFA will be lost or terminated. In order to reinstate the fruit fly PFA, the procedures for the establishment and maintenance outlined in this standard should be followed. In such cases, the trading partners will be immediately informed of the change in FF-PFA status as soon as possible.

Annex 1: Guidelines on corrective action plans

The detection of a single fruit fly (adult or immature) of the target species in the FF-PFA, the NPPO will start with the enforcement and implementation of a corrective action plan. The objective of the corrective action plan is to ensure that eradication procedures are correctly applied to eradicate the fruit fly species and to enable reinstatement of pest status in the affected area into

the FF-PFA. The NPPO will implement any corrective action if the target species and other invasive fruit flies are detected in the FF-PFA. The NPPO have the responsibility of coordinating any action to be taken.

The corrective action plan should be prepared taking into account the biology of the target fruit fly species, the geography of the FF-PFA area, climatic conditions and host distribution within the area. The elements required for implementation of a corrective action plan include:

- legal framework under which the corrective action plan can be applied
- criteria for the declaration of an outbreak
- time scales for the initial response
- technical criteria for delimiting trapping, fruit sampling, application of the eradication actions and establishment of regulatory measures
- availability of sufficient operational resources
- identification capability
- effective communication within the NPPO and with the NPPO(s) of the importing country(ies), including provision of contact details of all parties involved.

Actions to apply the corrective action plan

(1) Determination of the phytosanitary status of the detection (actionable or non-actionable)

(1.1) If the detection is a transient non-actionable occurrence (ISPM 8:1998), no further action is required.

(1.2) If the detection of a target pest may be actionable, a delimiting survey, which includes additional traps, and usually fruit sampling as well as an increased trap inspection rate, should be implemented immediately after the detection to assess whether the detection represents an outbreak, which will determine necessary responsive actions. If a population is present, this action is also used to determine the size of the affected area.

(2) Suspension of FF-PFA status

If after detection it is determined that an outbreak has occurred or any of the triggers specified in section 2.4.1 is reached, the FF-PFA status in the affected area should be suspended. The affected area may be limited to parts of the FF-PFA or may be the whole FF-PFA.

(3) Implementation of control measures in the affected area

As per ISPM 9:1998, specific corrective or eradication actions should be implemented immediately in the affected area(s) and adequately communicated to the community.

Eradication actions may include:

- selective insecticide-bait treatments
- sterile fly release
- total harvest of fruit in the trees
- male annihilation technique
- destruction of infested fruit
- soil treatment (chemical or physical)
- insecticide application.

(4) Criteria for reinstatement of a FF-PFA after an outbreak and actions to be taken

The criteria for determining that eradication has been successful are specified in section 2.4.2 and should be included in the corrective action plan for the target fruit fly. The time period will depend on the biology of the species and the prevailing environmental conditions. Once the criteria have been fulfilled the following actions should be taken:

- notification of NPPOs of importing countries
- reinstatement of normal surveillance levels
- reinstatement of the FF-PFA

(5) Notification of relevant agencies

Relevant NPPOs and other agencies should be kept informed of any change in FF-PFA status as appropriate, and IPPC pest reporting obligations observed (NSPM: Pest Reporting).

- notification of NPPOs of importing countries
- reinstatement of normal surveillance levels
- reinstatement of the FF-PFA

Appendix 1: Fruit fly trapping

This appendix provides detailed information for trapping procedures for fruit fly species (Tephritidae) of economic importance under different pest statuses. It describes the most widely used traps, including materials such as trapping devices and attractants, and trapping densities, as well as procedures including evaluation, data recording and analysis.

1. Pest status and survey types

Pest surveys are required to maintain claims of "pest-free" status of an area, to detect new populations of quarantine pests, and to delimit populations of quarantine pests. There are five pest statuses where surveys may be applied:

- A. Pest present without control. The pest is present but not subject to any control measures.
- B. Pest present under suppression. The pest is present and subject to control measures. Includes FF-ALPP.
- C. Pest present under eradication. The pest is present and subject to control measures. Includes FF-ALPP.
- D. Pest absent and FF-PFA being maintained. The pest is absent (e.g. eradicated, no pest records, no longer present) and measures to maintain pest absence are applied.
- E. Pest transient. Pest under surveillance and actionable, under eradication.

The purpose of the survey should be clearly defined in the survey plan i.e., whether it is for the purpose of establishing boundaries of area (whole or part of a country) infested by or free from a pest and or/ for detecting the presence or absence of the pest in a given area or production sites and or/ verifying the characteristics of population of a pest to check pest freedom is maintained in given PFA.

Specific surveys such as detection, delimiting or monitoring surveys organized by the Plant Protection Directorate (NPPO) of Nepal or any other institute or organization authorized by NPPO are official surveys. Therefore these should follow a plan which is approved by the Plant Protection Directorate (NPPO) of Nepal or any other institute or organization authorized by NPPO. The three objectives of trapping survey are:

A. Detection survey: To determine if species are present in an area.

The purpose of detection survey is to detect the presence or absence of the pest in a given area or production sites. These are more frequently carried out to determine pest status in an area and they follow a definite survey plan, which is approved by the Plant Protection Directorate (NPPO)

of Nepal or any other institute or organization authorized by NPPO and are systematically organized. These surveys are carried out either seasonally or annually and or/ following the eradication measures applied to a pest in a given area or production sites. These surveys are organized following a definite survey methodologies based on statistical sampling, which are determined after taking into account the biology of the pest and employing appropriate detection techniques such as field diagnostic kits, traps etc. The results of survey are documented and communicated.

B. Delimiting survey: To determine the boundaries of an area considered to be infested or free from a pest.

The purpose of delimiting survey is to establish boundaries of area (whole or part of country) infested by or free from a pest. Such surveys are carried out initially based on the surveillance data and pest records maintained by the Plant Protection Directorate (NPPO) of Nepal or any other institute or organization authorized by NPPO. Delimiting surveys are carried out in the event of reported incidence of a pest spreading into new area and or/to initiate the establishment of pest free areas.

C. Monitoring survey: Ongoing survey to verify the characteristics of a pest population including seasonal population fluctuation, relative abundance host sequence and others.

The purpose of monitoring survey is to verify the characteristics of population of a pest to check pest freedom is maintained in a given PFA. Ongoing monitoring surveys are of paramount importance, if the pest free area is required to be established in a part of country. Monitoring surveys carried out also to verify the survey methodologies and implementation of specific phytosanitary measures in a given area.

Delimiting and detection surveys are needed for a PFA in a country where pest is present (e.g. for FF trapping with specific density and servicing, fruit sampling). Also see introduction and importance of survey, surveillance and monitoring and its effect in trade and procedure of survey surveillance and its authentication and validation and data keeping of introduction and importance of Pest Free Area and requirements for declaration of free area, MTF/NEP/060/STF/STDF-170, Government of Nepal, MoAD/DoA, WTO and FAO, July, 2010.

2. Trapping scenarios

As the pest status may change over time, the type of survey needed may also change:

- Pest present
- Pest absent

3. Trapping materials

The effective use of traps in undertaking fruit fly surveys relies on the combined ability of the trap, attractant and killing agent to attract and capture target fruit fly species and then to kill and preserve them for effective identification, counting data collection and analysis. Trapping systems for fruit fly surveys use the following materials:

- a trapping device
- attractants (pheromones, parapheromones and food attractants)
- killing agents in wet and dry traps (with physical or chemical action)
- preservation agents (wet or dry).

3.1 Attractants

Attractant traps are used to attract the insects through the use of insect lures. These traps will be positioned in the field at pre-determined sites after taking into account the insect habitat and crop

canopy and density of trapping. Pheromone traps used in fruit fly surveys for attracting fruit flies. The inspector will visit the trapping sites to collect the insect pests for identification and recording of trapping data.

3.1.1 Male-specific attractants

The most widely used attractants are pheromone or parapheromones that are male specific (Parapheromone methyl eugenol) for *Bactrocera* spp and *Dacus* spp (See ISPM 26)

3.1.2 Female-biased attractants

Female-specific pheromones/parapheromones are not usually commercially available.

3.2 Killing and preserving agents

Traps retain attracted fruit flies through the use of killing and preserving agents. In some dry traps, killing agents are a sticky material or a toxicant. Some organophosphates may act as a repellent at higher doses. The use of insecticides in traps is subject to the registration and approval of the product in the respective national legislation. In other traps, liquid is the killing agent. When liquid protein attractants are used, mix borax 3% concentration to preserve the captured fruit flies. There are protein attractants that are formulated with borax, and thus no additional borax is required. When water is used in hot climates, 10% propylene glycol is added to prevent evaporation of the attractant and to preserve captured flies.

3.3 Commonly used fruit fly traps

This section describes commonly used fruit fly traps. The list of traps is not comprehensive; other types of traps may achieve equivalent results and may be used for fruit fly trapping. Based on the killing agent, there are three types of traps commonly used:

Dry traps. The fly is caught on a sticky material board or killed by a chemical agent.

Wet traps. The fly is captured and drowns in the attractant solution or in water with surfactant. One of the most widely used wet traps is the McPhail trap.

Mixtures for McPhail traps:

Protein Lure:

- 1.6 g ammonium carbonate
- 40 g of borax powder
- 2g sodium hydroxide
- 12.5 ml protein hydrolysate (Flavex)
- 2 litres of warm water

Mix the protein hydrolysate with half the volume of water. Add the dry ingredients to the remaining water and stir until completely dissolved. Add to the protein hydrolysate mixture. This mixture (sufficient for 10traps) should be freshly made before out on a trap run. After the trap runany remaining mixture should be discarded.

Dry or wet traps. These traps can be used either dry or wet. Some of the most widely used are Easy trap, Multilure trap and Tephri trap.

4 Trapping procedures

4.1 Spatial distribution of traps

In suppression and eradication programmes, an extensive trapping network should be deployed over the entire area that is subject to surveillance and control actions. Trapping networks are also placed as part of early detection programmes for target fruit fly species. In this case traps are placed in high-risk areas such as points of entry, fruit markets, urban areas garbage dumps, as appropriate.

4.2 Trap deployment (placement)

Trap deployment involves the actual placement of the traps in the field. One of the most important factors of trap deployment is selecting a proper trap site. When possible, pheromone traps should be placed in mating areas. Traps should not be exposed to direct sunlight, strong winds or dust. It is of vital importance to have the trap entrance clear from twigs and leaves to allow proper air flow and an easy access for the fruit fly.

4.3 Trap mapping

A political map of the country or district or VDC is required showing the natural boundaries, high ways, roads, rivers and mountain areas with places for preparing the survey plan and organizing the survey on predetermined route. Field maps are required especially in the case of extensive cultivated area such as an orchard/plantation to collect the sample from specified plot.

Once traps are deployed at carefully selected sites at the correct density and distributed in an appropriate pattern, the location of the traps must be recorded. A map or sketch of the trap location and the area around the traps should be prepared (See National Guidelines for Surveillance on CTV and CGD, National Plant Quarantine Programme, DoA/MoAD, 2012 and 4.6 of section 4 of National Standard on Internal Quarantine Commodity: Lentil: National Standard on Internal Quarantine of Major Exportable and Consumable Commodities. BPRC Pvt. Ltd. 2011).

4.4 Trap servicing and inspection

Trap servicing includes rebating and maintaining the trap in a clean and appropriate operating condition. Traps should be in a condition to consistently kill and retain in good condition any target flies that have been captured.

Inspection intervals (i.e. checking for fruit fly captures) should be adjusted according to the prevailing environmental conditions, pest situations and biology of fruit flies, on a case-by-case basis. The interval can range from one day up to 30 days, e.g. seven days in areas where fruit fly populations are present and 14 days in fruit fly free areas. Service interval should be adjusted according to the prevailing environmental conditions.

4.5 Trapping records

The following information should be included in order to keep proper trapping records as they provide confidence in the survey results: trap location, plant where the trap is placed, trap and attractant type, servicing and inspection dates, and target fruit fly capture.

Up-to-date records should be maintained and made available to the NPPO of the exporting country and, where justified, also to the NPPO of the importing country. Records should be maintained as determined by the NPPO of the exporting country. Records should include date, name and signature of the person who carried out the task or prepared the document.

4.6 Flies per trap per day

Flies per trap per day (FTD) is a population index that indicates the average number of flies of the target species captured per trap per day during a specified period in which the trap was exposed in the field. The function of this population index is to have a comparative measure of the size of the adult pest population in a given space and time. It is used as baseline information to compare the size of the population before, during and after the application of a fruit fly control programme. The FTD should be used in all reports of trapping. The formula is as follows:

$$FTD = \frac{F}{T \times D}$$

Where,

F = Total number of flies

T= Number of serviced traps

D= Average number of days traps were exposed in the field

5. Trap densities

The trap densities need to be adjusted based on many factors including type of survey, trap efficiency, location (type and presence of host, climate and topography), pest situation and lure type. In terms of type and presence of hosts, as well as the risk involved, the following types of location may be of concern:

- production areas
- marginal areas
- urban areas
- points of entry (and other high-risk areas such as fruit markets).

Minimum trap density should be 4 traps per km². (10 traps per mi²), checked for target flies at least once a week for multivoltine and every 2 weeks for univoltine species.

6. Supervision activities

Supervision of trapping activities includes assessing the quality of the materials used and reviewing the effectiveness of the use of these materials and trapping procedures.

The effectiveness of trapping should be officially reviewed periodically by individuals not directly involved in conducting trapping activities. The timing of review will vary by programme, but it is recommended to occur at least twice a year in programmes that run for six months or longer. Aspects of a review include quality of trapping materials, record-keeping, layout of the trapping network, trap mapping, trap placement, trap condition, trap servicing, trap inspection frequency and capability for fruit fly identification.

The trap deployment should be evaluated to ensure that the prescribed types and densities of traps are in place.

Trap placement should be evaluated for appropriate host selection, trap relocation schedule, height, light penetration, fruit fly access to trap, and proximity to other traps. Traps should be evaluated for their overall condition, correct attractant, appropriate trap servicing and inspection intervals, correct identifying markings (such as trap identification and date placed), evidence of contamination and proper warning labels. This is performed in the field at each site where a trap is placed.

Appendix 2: Guidelines for fruit sampling

Only trained inspectors should collect samples, otherwise be under the supervision of or be assisted by a trained inspector. Sampling should be carried out in such a way that the samples represent the lot. Each sample that an inspector submits for laboratory analysis is considered to be an official sample. All samples should be representative of the lot. Appropriate measures should be taken to ensure that samples are not compromised during its handling, storage and

transport to the laboratory. If samples are improperly collected, mishandled, transported and/or are not representative of the sampled lot, the laboratory results may be inaccurate and inconclusive.

The inspector should obtain the correct sample number(s) from the appropriate sampling plan. All sample numbers have a unique identification name and code that identifies whether or not the sample is intended for monitoring, surveillance, compliance, or other inspection activities defined by the program. The size of the sample is indicated in the specifications for each sampling plan and depends on the laboratory tests to be performed.

The collected specimens should be immediately labeled giving a reference number; date of collection; location; host plant species/commodity; pest species (common/scientific); Name/signature of collector. Where it is not possible to identify the pest in the field it should be clearly stated as “unidentified”. The labeled specimens will be submitted to regional pest diagnostic laboratory along with specimen forwardal form pest identification to diagnostic/national referral laboratory along with specimen forwardal form for verification of pest identification.

The Plant Protection Directorate (NPPO) of Nepal should establish or designate a national referral laboratory for verification of pest diagnoses and have a control over regional pest diagnostic laboratories to improve their diagnostic capabilities. Specific guidelines may be developed for forwardal specimens for referral testing as well as handling quarantine specimens.

Information about fruit sampling is available in the following reference

- Enkerlin, W.R., Lopez, L. & Celedonio, H. 1996. Increased accuracy in discrimination between captured wild unmarked and released dyed-marked adults in fruit fly (Diptera: Tephritidae) sterile release programs. *Journal of Economic Entomology*, 89(4): 946–949.
- Enkerlin W. & Reyes, J. 1984. *Evaluacion de un sistema de muestreo de frutos para la deteccion de Ceratitis capitata (Wiedemann)*. 11 Congreso Nacional de Manejo Integrado de Plagas. Asociacion Guatemalteca de Manejo Integrado de Plagas (AGMIP). Ciudad Guatemala, Guatemala, Centro America.
- Programa Moscamed. 1990. *Manual de Operaciones de Campo*. Talleres Graficos de la Nacion. Gobierno de Mexico. SAGAR//DGSV.
- Programa regional Moscamed. 2003. *Manual del sistema de detección por muestreo de la mosca del mediterráneo*. 26 pp.
- Shukla, R.P. & Prasad, U.G. 1985. Population fluctuations of the Oriental fruit fly, *Dacus dorsalis* (Hendel) in relation to hosts and abiotic factors. *Tropical Pest Management*, 31(4): 273–275.
- Tan, K.H. & Serit, M. 1994. Adult population dynamics of *Bactrocera dorsalis* (Diptera: Tephritidae) in relation to host phenology and weather in two villages of Penang Island, Malaysia. *Environmental Entomology*, 23(2): 267–275.
- Wong, T.Y., Nishimoto, J.I. & Mochizuki, N. 1983. Infestation patterns of Mediterranean fruit fly and the Oriental fruit fly (Diptera: Tephritidae) in the Kula area of Mavi, Hawaii. *Environmental Entomology*, 12(4): 1031–1039. IV Chemical control.

Appendix 3: Preparation and dispatch of fruit fly larvae for identification

1. Larval Preparation:

- Wash larvae thoroughly in clean water
- Kill larvae by immersion in hot water (just off the boil)
- Allow the water to cool at room temperature

- Transfer larvae to 30% ethanol for 30 min
- Transfer larvae to 50% ethanol for 30 min
- Preserve larvae in 70% ethanol in a specimen vial

2. Infested fruit preparation

- Leave larvae in the fruit
- Place the fruit in 5-6 sheets of news paper (to absorb any liquid)
- Place the package in a secure container (not a plastic bag but preferably a food container with a freezer block)

3. Larval dispatch

- Place a small label containing the details of collection viz., location, trap number, date of collection, host species, name of the collector. The label should be written with lead pencil
- Also affix the label on the external side of vial.
- Place the specimen vials in a holder
- Seal the package and affix the address of Reference Entomologist and dispatch with an instruction 'Handle with care. Biological specimen. Rush for Delivery'.

Table 1: Field Record sheet for Fruit flies

Name of Fruit fly Monitoring Area				Week/Month: From: _____ To: _____			
Trap No.	Location of trap	Date Insp.	Host	Lure Type	No of flies/ trap	Species identified	Date recharge

Table 2: General Pest Record

Reference Number	
Scientific name of pest <ul style="list-style-type: none">• Common Name• Species Name:• Family• Order:	
Life stage of pest	<input type="checkbox"/> Egg; <input type="checkbox"/> Larvae(maggot) ; <input type="checkbox"/> Pupae; <input type="checkbox"/> Adult

Scientific Name of host <ul style="list-style-type: none"> • Variety • Common Name: • Species Name • Family 	
Plant parts affected:	<input type="checkbox"/> Leaves; <input type="checkbox"/> Stem; <input type="checkbox"/> Roots; <input type="checkbox"/> Buds/Flowers; <input type="checkbox"/> Fruits; <input type="checkbox"/> Seed ; and <input type="checkbox"/> Whole plant
Stage of crop:	<input type="checkbox"/> Seedling stage; <input type="checkbox"/> Vegetative Growth stage; <input type="checkbox"/> Flowering stage; and <input type="checkbox"/> Fruiting stage
Locality <ul style="list-style-type: none"> • Village • District 	
Date of Collection	
Name of the Collector	
Date of Identification	
Name of the Identifier	
Date of Verification	
Name of the Verifier	

Table 3: Specimen Identification Report

To (Name & Address of Field Inspector)
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6. Action taken on detection of fruit lies:

7. Signature & Date

8. Name

9. Designation of Officer