Technology Notes

Himalayan Phytopathological Society

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From the Vice Chancellor's Desk

The year 2019 has brought cheers to the farmers, as we have received plenty of rain and snow during this winter, which is a good omen for a rich crop harvest. I am happy to learn that '**Himalayan Phytopathological Society**' is ready with the next issue of the E-Magazine-**Technology Notes** to connect with the farmers. YSP-UHF continues its efforts to evolve and refine technologies for different regions of Himachal Pradesh to enhance the production and productivity of different crops for increasing the farmers' income. It is a proud moment for the university that most of the planting material of temperate fruit crops was sold in a week's time in the first week of January. The saplings of the fruit plants planted by the farmers must have established well due to good soil moisture and favourable environmental conditions. As the state is in the midway of implementation of mega World Bank funded HP Horticulture Development Project, the farmers must take this opportunity to go for high density planting of apple with the elite planting material imported under the project so that the farmers can obtain high productivity from their land holdings. Diversification is one of the options for sustainable increase in farm productivity, and there is an urgent need to diversify the horticultural crops. Farmers should specifically focus on quality planting material/seeds, and proper treatment before planting.

As it is start of the cropping season for temperate and sub-tropical fruits, farmers should keep a vigil on their plants for the occurrence of the diseases and insect pests, and undertake need based sprays as per package of practices. The farmers should follow integrated pest management in apple, stone fruits, mango, citrus and vegetable crops. As the University is working on developing eco-friendly approaches for pest management, these should be adopted for better quality of the horticultural crops and minimize the application of synthetic pesticides. I hope that the contents of this E-Magazine will be useful to the farming community of Himachal Pradesh, and wish them to have a bountiful harvest in the coming season.

HC Sharma

गेहूँ का पीला रतुआ : प्रकोप, पहचान एवं समाधान

ओम प्रकाश गंगवार

भा.कृ.अ.नु.प. – भारतीय गेहूँ एवं जौ अनुसंधान संस्थान,
क्षेत्रीय केन्द्र फलावरडेल, शिमला – 171002 हि0प्र0

गेहूँ भारत की एक मुख्य खाद्यान फसल है। भारत में इसका उत्पादन लगभग 3 करोड़ हेक्टेयर (30 मिलियन हेक्टेयर) में किया जाता है। वर्ष 2017 – 18 में भारत 9.97 करोड़ टन (99.7 मिलियन टन) गेहूँ उत्पादन के साथ विश्व में दूसरे स्थान पर है। परन्तु गेहूँ की खपत और बढ़ती हुई आबादी को मध्यनजर रखते हुए हमें गेहूँ की पैदावार लगातार बढानी होगी। गेहूँ की फसल भी अन्य धान्य फसलों की भाँति अनेक रोगों से ग्रसित होती है, जिसमें फफूंद (कवक) के द्वारा उत्पन्न होने वाला पीला रतुआ रोग सबसे व्यापक और विनाशकारी है। इस कवक का नाम *पक्सीनिया स्टइाइफॉरमिस* फार्मा स्पेसलिस *ट्रिटिसाइ* है। अनुकूल पर्यावरण परिस्थितियों (तापमान 16 – 18° सेल्सियस आद्रता >80%) में पीला रतुआ का प्रकोप अधिक होता है। उत्तरी भारत में पीला रतुआ जनवरी – फरवरी माह में गेहूँ की फसल को संक्रमित करके भारी नुकसान पहुंचाता है। यह रोग मुख्य रूप से पंजाब, हिमाचल प्रदेश, जम्मू कश्मीर, उत्तराखंड, हरियाणा और पश्चिमी उतर प्रदेश में गेहूँ की फसल को प्रभावित करता है। पीला रतुआ अतिसंवेदनशील किस्मों में शत – प्रतिशत नुकसान कर सकता हैं, हालांकि, पिछले चार दशकों में उपयुक्त रतुआ प्रबंधन रणनितियों को अपनाने के कारण इस रोग का कोई भी भारी प्रकोप नहीं हुआ है। पीला रतुआ प्रभावित पौधों में प्रकाश संश्लेषण प्रक्रिया कम हो जाती है, श्वसन एवं वाष्पीकरण बढ़ जाता है तथा जड़ों की संख्या में 75 तक की कमी हो जाती है । फलस्वरूप गेहूँ की उपज घट जाती है।

पीला रतुआ उत्पन्न करने वाला कवक अपने जीवन काल में पांच प्रकार के बीजाणुओं का निर्माण करता है जिनमे यूरेडोबीजाणु प्रमुख हैं। यह यूरोडोबीजाणु यूरेडियम पूयस्फोटिका में बनते हैं। एक पूयस्फोटिका में हजारों की संख्या में यूरेडोबीजाणु होते है, जोकि वायु के माध्यम से फैलकर स्वस्थ पौधों को सक्रंमित करते हैं। इस तरह से इस रोग का फैलाव होता है। पीला रतुआ कवक की पूयस्फोटिकायें मुख्यत: पत्तियों की उपरी सतह पर धारी के रूप में विकसित होती है। इसलिए पीला रतुआ को धारीदार रतुआ भी कहते हैं। इस रोग से ग्रसित पौधों की पत्तियां पीले रंग की दिखाई देती हैं। अगर हाथ की

Editors of the issue: Bhupesh Gupta, Anil Handa and HR Gautam

उंगलियों या सफेद कपड़े को रोग ग्रसित पत्तियों पर हल्के से रगड़ें तो हल्दी जैसा पीला पाउडर (चूर्ण) उंगलियों या कपड़े पर लग जाता है। पीला रतुआ से संक्रमित अतिसंवेदनशील किस्मों में तो यह हल्दी जैसा पाउडर जमीन पर भी दिखाई देता है। पत्तियों का पीलापन कई अन्य कारणें से भी हो सकता है जैसा कि नाईट्रोजन की कमी, खेत में पानी का अधिक समय तक ठहराव, या किसी कीट का प्रकोप, परन्तु इसमें पीला रंग उंगलियों या कपड़े पर नहीं लगता। दरअसल, पीला रतुआ से ग्रसित पौधों पर जो पीले रंग का पाउडर दिखाई देता है वो कवक के यूरेडोबीजाणु हैं। इस रोग का फैलाव वायु के माध्यम से इन्हीं यूरेडोबीजाणुओं द्वारा होता है। वातावरण का तापमान बढ़ने पर (>23° सेल्सियस) इस रोग का फैलाव रूक जाता है।

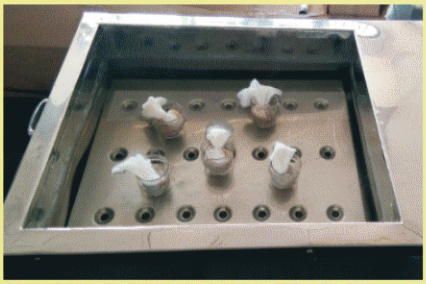
पीला रतुआ रोग का नियंत्रण आसान नहीं है क्योंकि यह कवक समय-समय पर नये अक्रामक प्रभेद उत्पन्न करता रहता है एवं इसका फैलाव हवा के माध्यम से होता है। लेकिन उचित रतुआ प्रबंधन रणनीतियों के अपनाने से रतुआ द्वारा होने वाले भारी नुकसान से बचा जा सकता है। कवक के नये प्रभेदों की पहचान एवं इनके विरूद्ध गेहूँ में प्रतिरोधक स्रोतों की जांच भा.कृ.अनु.प.- भारतीय गेहूँ एवं जौ अनुसंधान संस्थान, शिमला में व्यवस्थित तरीके से की जाती है। किसानों द्वारा रतुआ प्रतिरोधी किस्मों को उगाना ही इस रोग से निजात पाने का सबसे सस्ता एवं पर्यावरण हितैषी उपाय है। वर्तमान में पीला रतुआ के प्रकोप से बचने के लिए एचएस 507, एचएस 542, एचएस 562, बीएल 907(पर्वतीय क्षेत्रों के लिए) एचडी 3043, एचडी 3086, पीबीडब्ल्यू 723, यूपी 425, डब्ल्यूएच 1021, डब्ल्यूएच 1124, डब्ल्यूएच 1142 (उत्तर पश्चिमी मैदानी क्षेत्रें हेतु) को उगाने की सिफारिश की जाती है। पीला रतुआ का नियंत्रण उपयुक्त कवकनाशी रसायन द्वारा भी किया जाता है। यदि फसल पर पीला रतुआ दिखाई दे और इसके बढ़ने की संभावना हो तो कवकनाशी प्रोपीकोनाजोल (टिल्ट) या टाईएडीमेफान (बेलेटान) या टेबुकोनाजोल (फोलीकर) का 0.1 प्रतिशत (1 मिलीलिटर/1 लीटर पानी) की दर से छिडकाव करें। आवश्यकतानुसार इस प्रक्रिया को 15 दिनों के बाद दोहराहें। किसान समय-2 पर खेतों में गेहूँ फसल का निरीक्षण करते रहें ताकि रतुआ रोग का प्रारंभिक अवस्था मे उपयुक्त उपचार किया जा सके।

शिमला मिर्च में स्वस्थ नर्सरी उत्पादन के लिए गर्म पानी से बीज उपचार

डॉ. नरेंद्र कुमार भरत

बीज विज्ञान एवं प्रौद्योगिकी विभाग
डॉ यशवंत सिंह परमार औद्यानिकी एवं वानिकी विश्वविद्यालय
नौणी, सोलन (हि.प्र.) 173230

शिमला मिर्च एक महत्वपूर्ण सब्जी है जो हिमाचल प्रदेश में खुली और संरक्षित खेती में उगाई जाती है। फसल कई बीमारीयों से प्रभावित होती है जैसे कि नर्सरी में कमरतोड़ रोग, विषाणु रोग, एन्थ्रेक्नोज, फाइटोफ्थोरा लीफ ब्लाइट और फ्रूट रोट, सरकोस्पोरा स्पॉट, बैक्टीरियल स्पॉट आदि। अधिकांश बीमारीयां संक्रमित बीजों से फैलती हैं। किसानों को इन रोगों के नियंत्रित करने के लिए रासायनिक फफूंदनाशकों का उपयोग करना पड़ना है, जो महंगे होते हैं और इसके अतिरिक्त इनसे पर्यावरण प्रदूषण और स्वास्थ्य संबंधी खतरे भी होते हैं। नर्सरी में बुवाई से पहले बीज का उपचार इन रोगों के लिए एक प्रभावी प्रबंधन है। विश्वविद्यालय के बीज विज्ञान और प्रौद्योगिकी विभाग ने हानिकारक रसायनों का उपयोग किए बिना बीज जनित रोगों को नियंत्रित करने के लिए गर्म पानी से बीज उपचार की यह तकनीक विकसित की है।



बीज को पहले एक कपड़े में बाँध दिया जाता है जो पाँच मिनट के लिए सामान्य पानी में भिगोया जाता है। इसके बाद बीजों को 30 मिनट के लिए 50-52°C पर गर्म पानी में डाला जाता है। जो तापमान समायोजन आधारित एक उपकरण में किया जाता है। उपचारित बीजों को छाया में सुखाने के बाद नर्सरी में बोया जाता है। गर्म पानी से बीज उपचार न केवल बीजों से जुड़े रोगजनकों को मारता

है बल्कि बीज अंकुरण में भी सुधार करता है। इस पहलू में किए गए शोध कार्य से पता चला है कि गर्म पानी से उपचारित बीजों में अनुपचारित बीजों की तुलना में अंकुरण में 15 – 18% की वृद्धि, नर्सरी में कमरतोड़ रोग का 80 – 85% नियंत्रण, वायरस रोगों का 90 – 100% नियंत्रण पाया गया। हालांकि, गर्म पानी का तापमान इस तकनीक का बहुत महत्वपूर्ण कारक है और अगर तापमान अधिक हो जाता है तो यह बीज के अंकुरण को प्रभावित करेगा। इसलिए विशेषज्ञों की सलाह के तहत ही किसानों को यह उपचार करने की सलाह दी जाती है। किसान अपने बीज का मुफ्त उपचार करवाने के लिए विभाग के वैज्ञानिकों से भी संपर्क कर सकते हैं।

Managment tips for apple diseases

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Regular surveys and surveillance of apple orchards were conducted during 2018. Incidence of three major fungal pathogens viz. *Marssonina cornaria*, *Venturia inaequalis*, *Alternaria* spp. Maximum disease incidence (100%) and severity (30%) of Marssonina blotch was recorded in Rohru block, whereas, maximum disease incidence (100%) with a severity (45%) of Alternaria leaf spot was recorded in Kotkhai area. Apple scab was recorded in four orchards in Gahan area of Nankhari block and Kharapathar area in Jubbal with 65.0 and 35.0 percent incidence, respectively.

Apple scab

Alternaria leaf spot

Besides these diseases, bleeding canker (c.o. *Cryptosporiopsis corticola*) incidence was recorded in Kotkhai (23.0%) and Madaog area of Jubbal (19.0%). The disease scienerio mentioned above is also prevalent in other apple growing areas of the state with some variations in the incidence and severity. Hence, it is advised to take the precautions and preventive measures for the management of diseases during 2019:

Management

- Collect and decompose fallen leaves in winter to reduce primary inoculums.
- Spray urea (5%) on fallen leaves for proper decomposition of foliar pathogens
- To ensure fungicidal sprays for the management of apple scab as per recommendation in orchards/ areas where scab was recorded during last year.
- Prune trees regularly to avoid overcrowding and allow adequate light penetration and air circulation in the orchard.
- Keep the orchard area clean from weeds and bushes to avoid excessive humid conditions.
- Prune the cankered branches with application of recommended pastes (Chaubatia paste: 800gm Copper carbonate; 800 gm lead oxide; 1 litre Linseed oil, White paint- 1 litre white enamel paint; 10gm carbendazim) on cut ends.
- Spray Bordeaux mixture (1.0%) after pruning (late dormancy) for management of cankers.
- Adopt spray schedule released by Department of Horticulture, Himachal Pradesh in collaboration with Dr YS Parmar University of Horticulture & Forestry, Nauni, Solan for management of foliar fungal diseases.

Procedure for Import of Planting Material

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Quality planting material is an important requirement for higher production and productivity. Institutions or individual farmers can import quality seed and planting material from other countries. The import of agricultural commodities is presently regulated through the Plant Quarantine (Regulation of Import into India) Order, 2003 issued under DIP Act, 1914 incorporating the provisions of New Policy on Seed Development, 1988. The primary objectives of the legislation and the respective order is (i) To prevent the introduction and spread of exotic pests that are destructive to crops by regulating/restricting the import of plants/plant products and (ii) to facilitate safe global trade in agriculture by assisting the producers and exporters by providing a technically competent and reliable phytosanitary certificate system to meet the requirements of trading partners.

The importer or his agent shall apply for permit in PQ Form-02 in duplicate along with following enclosures:

i) Demand Draft / Pay Order for **Rs.300**/- (Rupees Three hundred only) drawn in favour of "Pay and Accounts Officer, Department of Agriculture and Co-operation (Ministry of Agriculture)" of the concerned area of jurisdiction from any Nationalised Bank.
ii) Catalogue / invoice
iii) Registration Certificate issued by National Seed Corporation or Director of Horticulture / Agriculture (as the case may be)
iv) The importer should apply for certification of post-entry quarantine facility to the Inspection Authority (IA) in PQ Form-18 well in advance and obtain the Certificate of approval of post-entry quarantine facility in PQ Form-19, issued by IA or any officer authorised by Plant Protection Advisor to the Government of India and submit the same along with an undertaking in PQ Form-20 by the importer to grow the imported plants and plant materials under the approved post-entry quarantine facility (applicable in respect of seeds and planting materials that require post-entry quarantine).

Revised conditions of Post-entry quarantine Order 2003 (Replaced vide S.O.2286(E), dated 04.06.2018)

Where the Officer-in-Charge of the Regional Plant Quarantine Station, after inspection of the consignment is satisfied, shall accord provisional clearance under PEQ on the production, by an importer, of a certificate from the IA with the stipulation that the plants shall be grown in such PEQ facility for the period specified in the PQ Order.

After according provisional release under PEQ, the Officer-in-Charge of the Regional Plant Quarantine Station at the entry point shall inform IA, having jurisdiction over the PEQ facility, of their arrival at the location wheresuch plants would be grown by the importers.

Consignment or part thereof shall not be removed from the designated PEQ facility by way of donation/ distribution/ sale etc. until such time the consignment is granted final clearance by Plant Protection Adviser or the officer authorized by him.

It shall be the responsibility of the importer or his agent -(i) to intimate the IA in advance about the date of planting of the imported plant or seed.(ii) not to transfer or part with or dispose the consignment during the pendency of PEQ except in accordance with a written approval of IA. (iii) to permit the IA complete access to the PEQ facility at all times and abide by the instructions of such IA. (iv) to maintain an inspection kit containing all requisite items to facilitate nursery inspection and ensure proper plant protection and upkeep of nursery records.(v) to extend necessary facilities to the IA during his visit to the nursery and arrange destruction of any part or whole of plant population when ordered by him in the event of infection or infestation by a quarantine pest, in a manner specified by him.

The Inspection of the consignment in PEQ facility shall be carried out at frequent interval by IA jointly with the nominated Officers of DPPQS. The frequency of the inspections shall be decided considering the growing period of the consignment subject to a minimum of two inspections out of which one inspection shall invariably at the end of PEQ period of the plant species concerned in accordance with the guidelines issued by the Plant Protection Adviser, with a view to detect any pests and advise necessary phytosanitary measures to contain the pests.

Where the plants in the PEQ are found to be affected by pests and diseases during the specified period the IA shall: -(i) Order the destruction of the affected consignment of whole or a part of the plant population in the PEQ if the pest or disease is exotic, or (ii) Advise the importer about the curative measures to be taken to the extent necessary, if the pest or disease is not exotic and permit the release of the affected population from the PEQ only after curative measures have been observed to be successful. Otherwise, the plants shall be ordered to be destroyed.

Where destruction of any plant population is ordered by the IA, the importer shall destroy the same in the manner as shall be directed by the IA and under his supervision.

At the end of final inspection, the IA shall forward a copy of the report of PEQ inspection duly signed by him to the Plant Protection Adviser under intimation to officer-in-charge of concerned PQ station.

Final decision regarding release of the consignments shall be granted only by Plant Protection Adviser or the officer authorized by him taking into consideration of inspection report.

(Professor and Head is also Inspection Authority (Horticultural and Forestry Crops) for Post Entry Quarantine of Govt. of India for Himachal Pradesh)

Important diseases of mango and their management

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Mango is an important crop of sub tropical area of Himachal Pradesh. Mango is cultivated on an area of 41.52 ha with an annual production of 47.40 thousand MT. Blooming period for the crop in the region starts in the end of February and continuous till March. Powdery mildew, anthracnose and mango malformation are important diseases that lead to huge losses. Whitish or greyish powdery growth on inflorescence/ panicles and tender leaves is the most common stage of powdery mildew along with some symptoms of powdery growth on leaves and shoots. Young infected leaves fall prematurely if covered on the underside, and mature infected leaves develop purplish brown spots. Infected fruits are often malformed and off-colored. The infected fruits do not grow in size and drop at the pea stage.

Powdery mildew

The anthracnose appears on young leaves, stem, inflorescence and fruits. Lesions develop primarily on young leave and flowers panicles Blossom blight can affect both the inflorescence stalk and the individual flowers. Infection reduces fruit set and production considerably, since affected flowers are killed. In the stalk, elongated dark gray to black lesions appear. Blighted flowers get dried and their colour varies from brown to black. Latent infection of fruits also get established before harvest. The ripening fruits show typical anthracnose symptoms. Black spots appearing on skin of the affected fruits gradually become sunken and coalesce.

Anthracnose

Mango malformation is mainly of two types i.e. vegetative and floral malformation. Vegetative malformation is more commonly found on young seedlings which produce small shootlets bearing small scaly leaves with a bunch like appearance on the shoot apex producing hypertrophied growth. The seedlings, which become malformed early, remain stunted and die while, those getting infected later resume normal growth above the malformed areas. Floral Malformation is the malformation of panicles. The primary, secondary and tertiary rachis become short, thickened and hypertrophied. Such panicles are greener and heavier with increased crowded branching. These panicles have numerous flowers that remain unopened and are predominantly male and rarely bisexual. They continue to grow and remain as black masses of dry tissue during summer but some of them continue to grow till the next season. They bear flowers after fruit set has taken place in normal panicles and contain brownish fluid. To prevent the outbreak of these diseases and reduce the crop losses, field sanitation is very important. Regular monitoring of mango orchards for appearance of diseases, removal/pruning of infected leaves and malformed panicles reduces the load of primary inoculum. Spraying with 0.1% carbendazim or 0.05% hexaconazole or 0.4% wettable sulphur or 0.1% Karathane or 0.05% difenoconazole gives effective control of powdery mildew while, spray of 0.8% Bordeaux mixture twice at 15-20 days interval effectively manages the anthracnose. For the management of mango malformation, two sprays of 0.6% potassium meta-bisulphite one each in October and January should be given. Besides, advisory issued from time to time by the Department of Plant Pathology, UHF, Nauni should be strictly followed.

Mango Malformation

Grow Shiitake mushroom for higher returns

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Mushroom cultivation can be an important self employment entrepreneur role in supporting the local economy by contributing to subsistence food security, nutrition, and medicine; generating additional employment and income and offering opportunities for processing enterprises (such as pickling and drying). Shiitake (*Lentinula edodes*) is the most important culinary medicinal mushroom which ranks at number two in terms of total mushroom production in the world only next to button mushroom. It is used for diseases involving depressed immune function including cancer, AIDS, environmental allergies, Candida infections and frequent flu and colds. Shiitake is also beneficial for soothing bronchial inflammation and regulating urine incontinence as well as for reducing chronic high cholesterol.

Though the cultivation of shiitake mushrooms first began in China, it is the Japanese who are the largest producers. In India, the Directorate of Mushroom Research, HP and Indian Institute of Horticulture Research, Bengaluru have developed technology for shiitake mushroom cultivation. Department of Plant Pathology, Dr. Y.S. Parmar University of Horticulture and Forestry has refined the cultivation Technology Of Shiitake Mushroom by growing it on saw dust of willow (*Salix tetrasperma).*

Shiitake mushrooms are cultivated on logs or sawdust of non-aromatic broadleaf tree species. Oak (Quercus spp.), chinkapin (Castanopsis spp.), hornbeam (*Carpinus* spp.), poplar (*Liquidambar* spp.), alder (*Alnus* spp.), beech (*Fagus* spp.), birch (*Betula* spp.), mango (*Mangifera indica*) etc. are considered to be superior quality substrates suitable for shiitake cultivation. Willow sawdust proved to be a better substrate for the commercial cultivation of Shiitake as the mushroom crop can be harvested within 45–60 and on average of 750 g of mushroom per kg of willow sawdust can be harvested. However, on willow logs, shiitake mushrooms start fruiting earlier than when grown on logs of other tree species with a 30% conversion rate from the start to the harvest of the mushrooms.

Commercial cultivation can be carried out on sawdust of broad leave trees using saw dust (80 kg), wheat bran (19 kg) and calcium carbonate (1 kg). Water should be adjusted to 60-65% and pH to be adjusted to 5.5-6.0 using gypsum. Saw dust is soaked for 16-18 hours and wheat bran for three hours. All the ingredients are thoroughly mixed and filled in the bags (1.5 to 2 kg) and sterilized in an autoclave at 22 psi for 1½-2 hours. The sterilized bags are spawned @ 3% (dry weight basis) under aseptic conditions and Incubated at 22-26°C. Spawn run may take 60-80 days. For induction of fruiting suitable temperature, high RH, good ventilation and cold water/ shock treatment are required. After 5-8 days of cold-water (4-6°C) treatment for 10-20 minutes, initiation of primordia begin. The fruit bodies further develop and became ready to harvest in next 5-7 days.

Log cultivation

Sawdust cultivation

Shiitake mushrooms can be grown outdoors on almost any deciduous wood that retains its bark for a number of years .Logs should be cut from living trees free of any decay. Trees should be harvested during the dormant or winter season when the wood contains the maximum amount of stored carbohydrates. Production involves inoculating fresh cut hardwood logs by placing spawn into holes drilled in each log. The holes are then covered with wax or other material to seal in moisture and protect against contamination.Logs are then incubated in a "laying yard" under forest shade for about one year before fruiting (mushrooms) begins. The log will continue to fruit biannually for three to four years. Farmers can contact the Department of Plant Pathology, UHF, Nauni for further details of cultivation and availability of the spawn (seed).

TECHNOLOGY STRIDES

Loop Mediated Isothermal Amplification (LAMP): An assay for rapid detection of plant pathogens

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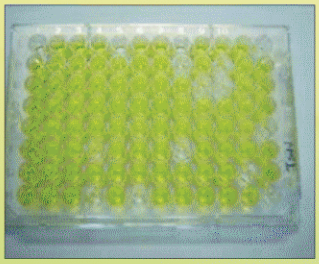
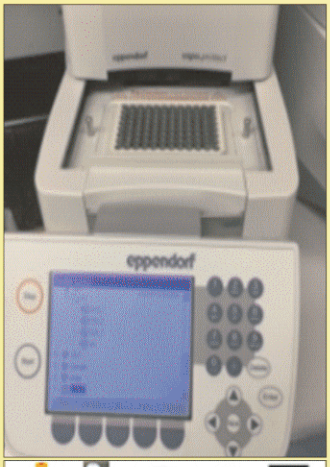
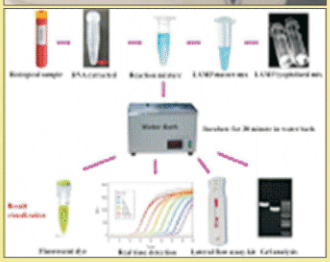
Accurate detection of plant pathogens is a crucial step in the process of disease management. In routine practices for plant disease diagnosis, visual observations of the infected plant/plant parts based on symptoms continue to be the dominant way of diagnosis, if required, followed by microscopy and isolation. The serological (Enzyme-Linked Immuno Sorbent Assay i.e. ELISA) and nucleic acid based detection (PCR) methods are the next best for exact identification of the diseases, however, these are not easily transferable to the field. In particular, the cost and complexity of the thermal cycling equipment required for polymerase chain reaction (PCR) restricts the use of these methods mainly



to centralized facilities. Loop-mediated isothermal amplification (LAMP) is a novel molecular detection technology that specifically detect specific nucleic acid sequences genomic DNA) and has the potential to overcome many of the limitations of PCR based methods. Because the LAMP reaction is isothermal, it can be performed in a heat block or water bath, thereby removing the need for specialized equipments. In addition, positive amplification can be observed by colorimetric or fluorescent dyes (HNB i.e. hydroxy napthol blue), removing the need to run gels. Both of these factors contribute to transferability to the field. Because of its speed, robustness and simplicity, the use of LAMP is gaining popularity for diagnostics in human medicine and, more recently, in plant health *viz.,* fungi, bacteria, viruses including phytoplasma detection. The LAMP assay can be used to test crude extract prepared directly from symptomatic lesions. It is characterized by the use of 4 different primers (*i.e.* F3, B3, FIP and BIP) together with PCR primers (F and B) specifically designed to recognize 6 distinct regions on the target gene and the reaction began with the binding of the inner primers containing sequences of the sense and antisense strands of the target DNA at a constant temperature (65°C). This is followed by strand displacement DNA synthesis by the outer primers. Subsequently, the cyclical amplification, elongation, and recycling leads to the amplification of the target sequence. The process can be completed in a single step, by incubating the mixture of samples, primers, DNA polymerase with strand displacement activity and substrates at temperature of 60-65°C. The entire test can be completed in 30-60 minutes, making it faster than a current diagnostic standard, the conventional PCR. It can also be done on a RNA target using reverse transcriptase and Bst polymerase (original polymerase for LAMP). This assay may be useful in disease forecasting more accurately and may be helpful in decision-making for the control of diseases. It can also be utilized in quarantine procedures so as to overcome the accidental introduction of pathogens at entry ports.





NEWS DESK

A National symposium on "**Alternative approaches in plant health management for enhancing farmers' income"** organized by Department of Plant Pathology, Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan (HP) in association with Indian Phytopathological Society, New Delhi and Himalayan Phytopathological Society, Nauni, Solan (HP) w.e.f. November 2-3, 2018, was inaugurated by Dr V L Chopra, Former Member, Planning Commission & Former Secretary, DARE & DG, ICAR who was the Chief Guest and Dr VS Thakur, Former Vice Chancellor and presently Director of Extension Education , YSP UHF, Nauni, presided over the function. Dr Chopra emphasized the need to strengthen the extension set up of State Departments of Agriculture and Horticulture for effective dissemination of the crop production technologies. Dr Thakur highlighted the importance of plant pathology in containing the losses in crops and ensuring better returns to the farmers. During the inaugural session, four publications i.e. **Souvenir-cum-Abstract Book**, a half yearly e-magazine "**Technological Notes**", two books viz. "**Alternative Approaches in Plant Disease Management"** by Dr Satish K Sharma and Dr HR Gautam and **"A Comprehensive Book on Agriculture Competitive Exams"** by Dr H R Gautam were released by the Hon'ble Chief Guest.

The symposium was attended by more than 260 Scientists, Research Scholars, and Post graduate students from different states of the country and farmers from different agroclimatic zones of Himachal Pradesh. The presentations in different sessions addressed various emerging issues related molecular diagnosis, disease epidemiology, forecasting/ forewarning, ecofriendly approaches, plant nutrition and biotic stresses, induced resistance, restricted/need based use of chemicals and alternative approaches for disease management on a sustainable basis for enhancing farmers' income. Interaction session with the farmers for reducing input costs through natural farming systems and mushroom culture for enhancing income was held in which farmers took active part in the technical discussions. In the last four decades, effective management of diseases has played a key role in augmenting food production, but diseases are still responsible for causing 14-15 per cent losses of the global harvest.

Dr HC Sharma, Hon'ble Vice Chancellor, YSP UHF, Nauni was the Chief Guest and Mr. Ranbir Singh, Chief General Manager, NABARD, Shimla presided over on the valedictory function. Dr JN Sharma, Director of Research, YSP UHF, Nauni, was the special guest of honour. During the closing session, certificates were awarded to the winners of poster session and Prof. M.J. Narasimhan Academic Merit Award winners for north zone by the Hon'ble Chief Guest. Dr Kajal Sharma bagged the first position and Dr Aditi Sharma occupied the second position from the north zone. They were further recommended for participation in award contest at the national level in National Symposium at BHU, Varanasi.

MEMBERSHIP OF HIMALAYAN PHYTOPATHOLOGICAL SOCIETY (HPS) IS OPEN

The erstwhile Phytopathological Club in the Department of Plant Pathology is now formed as **"Himalayan Phytopathological Society"** w.e.f. September, 2017 and this has been registered under the Societies Registration Act, 2006 with Registration No. PSH/16/892/2018 dated 31.12.2018. The Society has been formed with a vision to create a forum for discussion, deliberations and communication among all stakeholders for furthering the discipline of plant pathology to develop sustainable disease management practices in the Himalyan region. All the scientists, Officers of State Departments of Agriculture and Horticulture, public and private entrepreneurs, students and farmers desirous for working towards this vision are requested to come together and become member of the HPS by paying Rs. 500/- in favour of A/C name: Himalayan Phytopathological Society; Bank Name- UCO Bank, UHF, Nauni, HP 173230; Account number: 0969100001689; IFSC code: UCBA0000969. The registration form of the Society will be uploaded soon on the University website in the link of the Society. After remitting the requisite fee, the intimation in the prescribed registration form may be sent to the Dr Satish Kumar Sharma, Joint Director Research (Horticulture) and Secretary HPS through E-mail: satishsharma2026@gmail.com

FARMING HEROES

Mr Tej Ram Sharma belonging to a remote Village Gothra in Karsog valley of district Mandi in Himachal Pradesh is engaged in organic farming for the last 7 years and growing vegetable crops with organic manures and biopesticides in 0.5 ha area. He is making earnings of Rs 10-12 lakh per ha. He received a prize of Rs. 51,000/- from Hon'ble Union Agriculture Minister Sh Radha Mohan Singhji in January 2018 for his extraordinary efforts in promoting organic farming. He is also growing exotic vegetables like broccoli, lettuce, red cabbage etc.