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RESEARCH ARTICLE

Major diseases of field and horticultural crops in Northern Bihar region of India

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SUMMARY

A survey was conducted to determine the status of major diseases of field and horticultural crops grown in Saharsa, Supaul, Madhepura and Khagaria districts of northern Bihar, India. Three blocks in each district and three villages in each block were surveyed through a random field survey method. Per cent disease incidence was recorded on randomly selected plants in a particular field of selected location. The incidence of diseases was observed on the basis of typical field symptoms and later the association was confirmed through microscopic examinations in the laboratory. In view of maximum diseases incidence; foliar blight of wheat, sheath blight of rice, turcicum leaf blight of maize, mungbean yellow mosaic virus, Alternaria blight of mustard were recorded with >50% incidence in these districts. However, dry root rot and wilt of chickpea and lentil, wilt of pigeonpea, powdery mildew of pea, Alternaria leaf spot of linseed, Fusarium wilt and red rot of sugarcane and root rot of jute were noticed with 10 to 50% incidence. In fruit crops; sigatoka disease of banana was noticed with >50% incidence, while, anthracnose/ die back and floral malformation of mango, wilt of banana, foot rot of papaya and anthracnose of guava and citrus canker were observed with 10-50% incidence. Diseases *viz.,* late blight, bacterial wilt, black leaf spot/ rot, leaf curl, yellow vein mosaic virus, die back and late blight were recorded with >50% incidence in tomato, brinjal, cauliflower, cucurbits, okra, chilli and potato, respectively. The purple blotch of onion, black leaf rot of cabbage and collar rot of elephant foot yam were noticed with 10-50% incidences.

Key Words : Floral malformation, Gummosis, Hooghly wilt, Panama wilt, Saharsa

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The role of agriculture in context of the world and Indian economy is very important. Most of the agricultural research conducted in the 20th century has been focused on increasing crop productivity either through increasing input use efficiency, crop improvement, or crop protection. This has become necessary because of ever increasing human population

and ultimately increasing food needs (Nellemann *et al*., 2009). Plant disease has been a most important factor influencing food production and human societal development over thousands of years (Palmgren *et al*., 2015). Throughout the early agricultural era, the occurrence of plant disease epidemics was seen as a punishment from the gods and overt plant disease management approaches were extremely limited. Given generally low yields and the general lack of significant food reserves, once disease epidemics occurred food shortages could easily develop resulting in disastrous effects on human society-such as the Irish Famine caused by potato late blight and the Bengal famine caused by rice brown spot. Every year, very large amounts of food produce are lost qualitatively and quantitatively due to plant diseases (Strange and Scott, 2005). Despite the contribution of scientific and technological advances to significant reductions in the frequency and intensity of epidemics in recent times, 20–30% of actual production is still lost due to plant diseases per year (Oerke, 2006). These losses reflect incomplete knowledge relating to the causes and mechanisms behind epidemic development, a situation that unsurprisingly reflects a lack of adequate approaches to even efficiently manage them, let alone eliminate them. Furthermore, many plant disease management strategies together with many agronomic practices used in modern agriculture have also generated unintended problems including loss of biodiversity and other natural resources, environmental deterioration and accelerated evolution in pathogens (Gonthier *et al.*, 2014).

Plant protection is primarily focused on protecting crops from yield losses due to biotic and abiotic stresses. Crop losses due to diseases are a major threat to the incomes of rural families and to food security worldwide (Avelino *et al.,* 2015). Quantitative information on crop losses and a better understanding of their drivers have been mentioned as essential for evaluating the efficacy of crop protection practices, assessing systems sustainability (Cooke, 2006), making better decisions for integrated pest management (Savary *et al.*, 2006) and evaluating the effectiveness of management practices for pest and disease as an ecosystem service (Allinne *et al.,* 2016). World Agricultural production is affected by the annual loss of about 20% to 30% on an average due to plant diseases. From the survey conducted by National Bank for Agriculture and Rural Development in 2013, India loses about 30% of its crops due to diseases each year. This loss is estimated to be Rs. 60, 000 cores annually. So, if a crop is affected by any disease, it will directly or indirectly affect our economy and human population which is dependent on crop/agriculture (Vipinadas and Thamizharasi, 2015). Diseases are often the most important constraint to the production of field and horticultural crops. They indirectly reduce yields by debilitating the plant and directly reduce the yield or quality of products before and after they are harvested. They range from aesthetic problems that lower the marketability of the harvested product to lethal problems that devastate local or regional production. Moreover, crops in India are attacked by numerous diseases which have been one of the challenges in the farming sector. Therefore, this study was aimed to identify and document diseases of major crops grown in agro climatic conditions of Saharsa, Supaul, Madhepura and Khagaria districts of North Bihar.

MATERIAL AND METHODS

Description of the study area :

The North Bihar region in India comprises 19 districts of Bihar state. Geographically, North Bihar extends between 82.3°E to 88.9°E longitude and 24.8°N to 29.3°N latitude (Tripathi *et al.*, 2019). Out of 19 districts, four districts *viz.,* Saharsa, Supaul, Madhepura and Khagaria occupying 7371 square kilometres area of North Bihar were surveyed during the present investigation to determine the incidence of major diseases of field and horticultural crops prevalent in these districts. The surveyed districts are adjoining with two major rivers *i.e. Ganga* and *Kosi* and come under hot sub-humid eco-region with hot-wet summer, cool-dry winter with an average annual rainfall of about 1300 mm. The major crops grown in the Saharsa district are rice, wheat, rape seed and mustard, linseed, lentil, gram, green vegetables, mango, litchi and guava. The cropping system in Madhepura district is paddy–wheat-moong, paddy-maize-jute, paddy-maize- summer vegetables and paddy-maize-summer moong. The crops grown in the Supaul district are paddy, wheat, jute moong and maize. In the Khagaria district, wheat is the prominent *Rabi* crop and maize is grown abundantly almost throughout the district, while banana cultivation as a cash crop has become prominent in the last two decades. Apart from these, fruits like mango and litchi are also being grown on large scale. (*https://www.bausabour.ac.in*) .

Disease survey and assessment of incidence:

A survey was carried out for 24 months during both

Table A : List of districts, blocks and villages surveyed for occurrence of crop diseases

District: Saharsa		District: Madhepura		District: Supoul		District: Khagariya	
Block	Village	Block	Village	Block	Village	Block	Village
Sattarkataiya	Purikh		Ketawan		Imamganj	Gogari	Rah Dham
	Barahsher	Singheswar	Rampatti	Raghopur	Raghopur		Mahesh Khunt
	Agwanpur		Bhelwa		Giripatti		Pakrail
Mahishi	Naharwar		Tekathi		Diwanganj	Khagariya	Mahsodi
	Bhagwatpur	Ghailadh	Bhatrandha	Pratapganj	Amaha		Hardaschak
	Mahishi		Wardaha		Benga Patti		Gaurashakti
Kahra	Bangaon		Gonsai Tola		Parsarma	Chautham	Devka
	Tulsiyahi	Madhepura	Matnaja	Supaul	Barail		Chhoti Teloncch
	Bharauli		Sadhuaa		Parsauni		Bhiriya

Kharif and *Rabi* seasons of 2016-17 to know the prevalence of diseases on the field and horticultural crops grown in the above four districts. Three blocks in each district and three villages in each block located at an appropriate distance were selected for the survey of diseases status prevalent in this area (Table A). The surveys were conducted during the time so that they should coincide with appropriate crop growth stages in all fields sampled. In this survey study, ten plants were selected randomly from each plot of the farmer's field. The incidence of each disease was made on the basis of typical visual field symptoms and later the association was confirmed through microscopic examinations in the laboratory. The per cent disease incidence (PDI) was calculated by the following formula.

$$\text{PDI} = \frac{\text{Number of diseased plants}}{\text{The total number of plants observed}} \times 100$$

Isolation and identification of the pathogen:

Diseased plant samples of leaves, fruits and twigs were collected in a paper envelope and brought to the laboratory for identification of pathogens. All materials used in this experiment were sterilized using ethyl alcohol except the samples. The diseased parts were cut into small pieces of 3 mm diameter with some healthy parts. The small pieces were washed with tap water and surface sterilized with 1% NaOCl for 1 minute, again rinsed with sterile water and blotted to dry on clean and sterilized tissue paper. In case of fungal diseases, after drying, three pieces were aseptically placed into Petridishes containing Potato Dextrose Agar medium. Then, the inoculated Petridishes were marked with the name of the sample and the date of inoculation. Inoculated plates were incubated in a BOD incubator maintained at 25°C for 5 days, until microbial growth of pathogen was visible on the medium surface surrounding infected plant samples inoculated on the medium (Anonymous, 1976). Identifications of the causal pathogen were carried out on the basis of specific colony/ cultural or morphological characters. Microbial growth was also examined under a compound microscope with 40X magnification (Aneja, 2004) to ascertain the identity of pathogen associated. Standard methodology was followed for the identification of other pathogens also.

RESULTS AND DISCUSSION

Investigations were made to determine the status of major targeted diseases of field and horticultural crops grown in agro climatic conditions of Saharsa, Supoul, Madhepura and Khagaria districts of North Bihar. The incidence of diseases was observed on the basis of typical field symptoms.

Incidence of diseases in cereal and cash crops :

Data presented in Table 1 indicate that there was the severe occurrence of foliar blight with >50% incidence in wheat followed by spot blotch with 10 to 50% incidence (Fig. 2: C and D). In rice, the incidence of sheath blight and bacterial leaf blight was severe. False smut and brown spot of rice appeared with 10-50% incidences, while, <10% incidence of sheath rot and khaira disease were also observed (Fig. 1A-F). Turcicum leaf blight of maize (Fig. 2B) was observed in a severe form followed by 10-50% incidence of brown spot and maydis leaf blight. Occurrence of post flowering stalk rot (Fig. 2 A), banded leaf and sheath blight, bacterial stalk rot, Pythium stalk rot and Rust with <10% incidence was also noticed in maize crop. Dry *root rot,* wet root rot and wilt were the major diseases noticed in chickpea with 10-50% incidence; however, the incidence of collar

rot was <10%. Severe and moderate incidence of yellow mosaic and Cercospora leaf spot respectively were recorded in mungbean. 10-50% incidence of pigeonpea wilt and mosaic, lentil wilt (Fig. 2E) and powdery mildew of peas were also noticed in this region. In mustard, >50% incidence of Alternaria blight was observed which was followed by white rust and Sclerotinia rot. Occurrence of Alternaria leaf spot with 10-50% incidence was also noticed in linseed. In some areas, the occurrence of Fusarium wilt (Fig. 2: F) and red rot in sugarcane; stem/ root rot and *Yellow vein mosaic virus* in jute were also recorded with 10-50% incidence. Hooghly wilt in jute crop was also noticed at some farmers' fields. As per the report of van Ginkel and Rajaram (1998), about 25 million ha of wheat land is affected by foliar blight and spot blotch globally. Of these, 10 million ha are in the

Table 1 : Incidence of major diseases of cereal and cash crops in Saharsa, Supoul, Madhepura and Khagaria districts of Bihar

Sr. No.	Crops	Disease incidence		
		Low (<10%)	Moderate (10 – 50%)	Severe (>50%)
1.	Wheat	–	Spot blotch *(Bipolaris sorokiniana)*	Foliar blight (*Helminthosporium sativum* and *Alternaria triticina*)
2.	Rice	Sheath rot (*Sarocladium oryzae*) and Khaira disease (Zn deficiency)	False smut (*Ustilaginoidea virens*) and Brown spot (*Bipolaris oryzae*)	Sheath blight (*Rhizoctonia solani*) and Bacterial leaf blight (*Xanthomonas oryzae* pv. *Oryzae*)
3.	Maize	Post flowering stalk rot-PFSR (*Fusarium verticillioides, Macrophomina phaseolina* and *Harpophora maydis),* Banded leaf and sheath blight-BLSB (*Rhizoctonia solani),* Bacterial stalk rot (*Erwinia dissolvens*), Pythium stalk rot (*Pythium aphanidermatum*) and Rust (*Puccinia sorghi*)	Brown spot (*Physoderma maydis*) and Maydis leaf blight-MLB (*Bipolaris maydis*)	Turcicum leaf blight-TLB (*Exserohilum turcicum)*
4.	Chickpea	Collar rot (*Sclerotium rolfsii)*	Fusarium wilt (*Fusarium oxysporum* f. sp. *ciceris*), Dry root rot (*Rhizocotonia bataticola*) and Collar rot (*Sclerotium rolfsii*)	–
5.	Mungbean	–	Cercospora leaf spot (*Cercospora* canescens)	*Mungbean yellow mosaic virus*
6.	Pigeonpea	–	Wilt (*Fusarium udum*) and Mosaic (*Pigeonpea sterility mosaic virus*)	–
7.	Lentil	Collar rot (*Sclerotium rolfsii*)	Wilt (*Fusarium oxysporum* f. sp. *lentis*)	–
8.	Peas	–	Powdery mildew (*Erysiphe pisi*)	–
9.	Mustard	White rust (*Albugo candida*) and Sclerotinia rot (*Sclerotinia sclerotiorum*)		Alternaria blight (*Alternaria brassicae* and *Alternaria brassicicola)*
10.	Linseed	–	Leaf spot (*Alternaria lini*)	–
11.	Sugarcane	–	Fusarium wilt (*Fusarium sacchari*) and Red rot (*Colletotrichum falcatum*)	–
12.	Jute	Hooghly wilt (*Ralstonia solanacearum*)	Stem and root rot (*Macrophomina phaseolina* and *Rhizoctonia bataticola*) and *Yellow vein mosaic virus*	–

Indian Subcontinent, including 9 million ha in India alone, mostly in the rice-wheat cropping system (Nagarajan and Kumar, 1998). Yield losses due to foliar blight of wheat have been reported to reach upto 20 to 30% in farmers' fields and experiment stations (Sharma and Duveiller, 2003). Sheath blight of rice is one of the major production limitations in the states of Eastern Uttar Pradesh, Chhattisgarh, Punjab, Odisha, Uttarakhand, Bihar, West Bengal, Haryana, coastal areas of Andhra Pradesh, Tamil Nadu, Kerala and parts of Karnataka

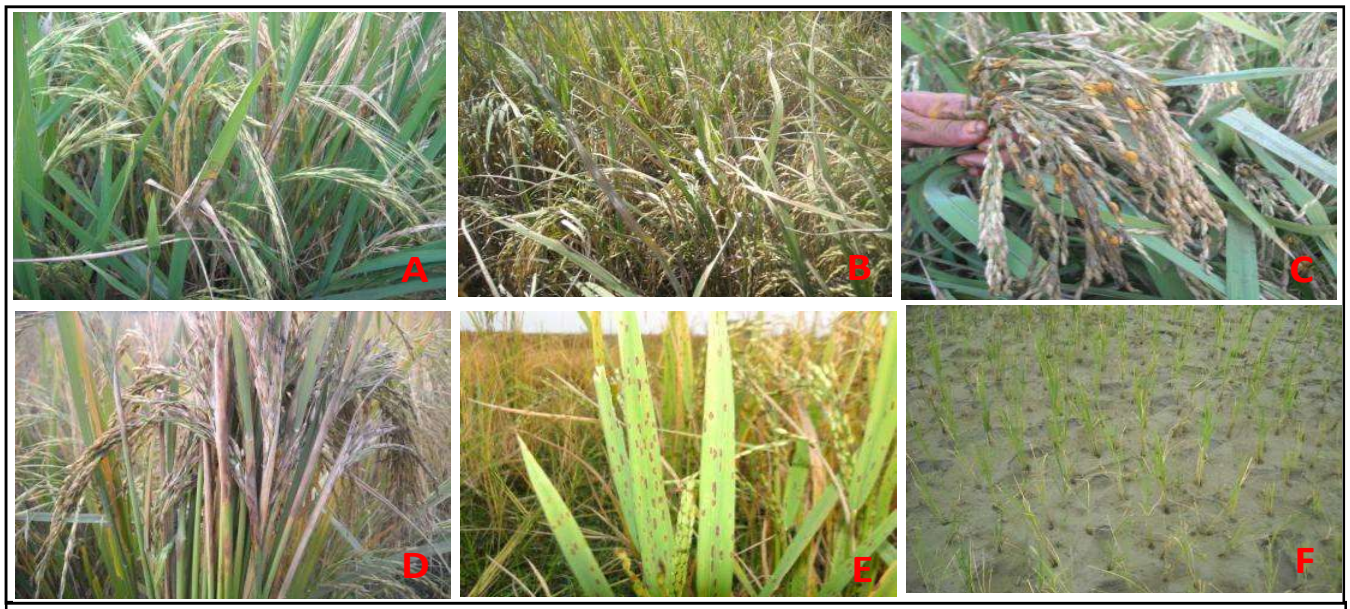

Fig. 1: Occurrence of rice diseases *viz.*, Sheath blight (A), bacterial leaf blight (B), false smut (C), sheath rof (D), brown spot (E) and khaira disease (F)

Fig. 2: Occurrence of Fusarium wilt with splitted lower stalk (A) and Turcicum leaf blight (B) of maize, foliar blight and spot blotch of wheat (C and D), Fusarium wilt of lentil (E) and sugarcane (F)

(Prakasam *et al.*, 2013). Bacterial leaf blight of rice has become one of the most severe and prevalent rice diseases globally. It may lead to 10-20% yield loss and upto 80% during an epidemic (Srinivasan and Gnanamanickam, 2005). The turcicum leaf blight is prevalent in almost all the maize growing areas of India

Table 2 : Incidence of major diseases of fruits and vegetables in Saharsa, Supoul, Madhepura and Khagaria districts of Bihar

Sr. No.	Crops	Disease Incidence		
		Low (<10%)	Moderate (10 – 50%)	Severe (>50%)
1.	Mango	Gummosis (*Lasiodiplodia theobromae*), Blossom blight (*Colletotritichum gloeosporioides*), Powdery mildew (*Oidium mangiferae*) and Loranthus (*Dendrophthoe falcate)*	Die back (*Lasiodiplodia theobromae*), Floral malformation (*Fusarium moliliforme* var. *Subglutinans*) and Anthracnose (*Colletotrichum gloeosporioides*)	–
2.	Banana	–	Panama wilt (*Fusarium oxysporum* f. Sp. *cubense*)	Leaf spot/ Sigatoka disease (*Cercospora musae*)
3.	Papaya	–	Foot rot (*Pythium aphanidermatum*), *Papaya bunchy top virus* and Leaf curl (*Papaya leaf curl virus*)	–
4.	Guava	Wilt (*Fusarium oxysporium* f. sp. *psidii*)	Anthracnose (*Colletotrichum gloeosporioides* and *Botryodiplodia theobromae*)	–
5.	Citrus	–	Bacterial canker (*Xanthomonas citri* pv. *citri*)	–
6.	Litchi	Powdery mildew (*Odium* spp.)	–	–
7.	Tomato	Early blight (*Alternaria solani*)	Leaf curl (*Tomato yellow leaf curl virus*)	Late blight (*Phytophthora infestans*)
8.	Brinjal	Little leaf (*Phytoplasma*)	Phomopsis blight *(Phomopsis* vexans)	Bacterial wilt (*Ralstonia solanacearum*)
9.	Cauliflower	Browning Boron deficiency	–	Black leaf spot/Alternaria blight (*Alternaria brassicae* and *Alternaria brassicicola*) and Black rot (*Xanthomonas campestris* pv. *campestris*)
10.	Cabbage	–	Bacterial/ black rot (*Xanthomonas campestris* pv. *campestris*)	Black leaf spot/Alternaria blight (*Alternaria brassicae* and *Alternaria brassicicola*)
11.	Cucurbits (Cucumber and Bottle gourd)	Foliar blight/Leaf spot *Pseudomonas syringae pv. Lachrymans* and Charcoal rot (*Macrophomina phaseolina*)	*Mosaic Cucumber mosaic virus*	Leaf curl (*Cucurbit leaf curl virus*)
12.	Okra	–	–	*Yellow vein mosaic virus* and leaf curl
13.	Chilli	Bacterial wilt (*Ralstonia solanacearum*)	Leaf curl (*Chilli leaf curl virus*)	Die back (*Colletotrichum capsici)*
14.	Potato	–	Mosaic and leaf curl (Potato virus A) and Early blight (*Alternaria solani*)	Late blight (*Phytophthora infestans*)
15.	Onion	Smudge (*Colletotrichum circinans*)	Purple blotch (*Alternaria porri*)	–
16.	Elephant foot yam		Collar rot (*Sclerotium rolfsii*)	–

(Jha, 1993) and it may cause yield losses upto 90% (Ribeiro *et al.*, 2016). Soil borne diseases such as *Fusarium wilt,* dry root rot, collar rot and black root rot are the major limiting factors in chickpea production. Yield loss of upto 70% in chickpea by dry root rot (Ray and Kumar, 2008), 77–94 % by *Fusarium wilt* (Nasir, 2003) and 10–100 % by collar rot (Rashid *et al.*, 2014) has been previously reported. Cercospora leaf spot inflicts heavy yield losses ranging from 23 to 96 per cent under natural epiphytotic conditions (Kaur, 2007). Yellow mosaic may cause upto 100% yield loss in mung bean (Bashir *et al.,* 2006). Wilt and sterility mosaic are the two economically most important diseases of pigeonpea in India and they are responsible for an annual monetary loss of 36 and 76 million US dollars, respectively, in India alone (Kannaiyan *et al.*, 1984). Lentil wilt is the most devastating disease of this crop around the world and it has been observed with 97.2% incidence (Ghatak *et al.*, 2015). Occurrence of powdery mildew in field pea has been reported with 45% incidence which can cause 25–50% yield losses (Fondevilla and Rubiales, 2012). Alternaria blight of mustard has been reported from all the continents of the world causing severe economic yield loss upto 40% (Mondal, 2008). Alternaria blight is one of the major limiting factors of linseed cultivation in Uttar Pradesh and it causes substantial losses in yield from 18 to 43.9% (Sharma and Arjariya, 2015). Agnihotri and Rao (2002) reported severe incidence of sugarcane wilt in combination with red rot occurred in major varieties in Bihar. According to Sarkar and Gawande (2016), the most important disease of jute is Stem rot caused by *Macrophomina phaseolina* followed by soft rot, mosaic and Hooghly Wilt. Thus, the findings of the present investigation are quite in conformity with the reports of earlier workers.

Incidence of diseases in horticultural crops:

In the present investigation, a survey for the occurrence of diseases on 6 fruits and >9 vegetables (Table 2) grown in this region, was also done. In mango, three diseases *viz.,* die back, floral malformation and anthracnose were noticed with 10-50% incidence followed by gummosis, blossom blight, powdery mildew and Loranthus with <10% incidences (Fig. 3 A-F). Severe and moderate incidence of Sigatoka disease (Cercospora leaf spot) and Panama wilt, respectively were noticed in banana crop (Fig. 3 G and H). Papaya diseases (foot rot, papaya bunchy top virus and leaf curl), guava anthracnose and citrus canker were recorded with 10-50% incidences. The occurrence of guava wilt and powdery mildew of litchi was sporadic with <10% incidences. Late blight of tomato (Fig. 4: A-B). was noticed as a major and very destructive disease with about 100% incidence followed by leaf curl and early

Fig. 3: Occurrence of vegetable diseases viz., late blight of tomato (A and B), black rot of cabbage (C), Alternaria blight of cauliflower (D), cauliflower browning (E), bacterial wilt of brinjal (F), die-back and anthracnose of brinjal (G) and purple blotch of onion (H)

blight. In brinjal, the severe incidence of bacterial wilt (Fig. 4 F) was observed followed by Phomopsis blight; however little leaf disease of brinjal occurred sporadically. Black rot and spot (Fig. 4 C and D) diseases in cauliflower were noticed in a severe form with >50 incidences, while, browning (Fig. 4 E) disorder was observed sporadically in cauliflower at the farmers field. Leaf curl and cucumber mosaic disease were observed as an important disease of cucurbits (cucumber and bottle gourd), however, leaf spot and charcoal rot of cucurbits appeared with <10% incidences (Fig. 5 A-C). In okra, chilli and potato; yellow mosaic, die-back/anthracnose (Fig. 4G) and late blight (Fig. 5D), respectively were observed in a severe form with >50% incidences. Viral diseases like leaf curl and mosaic were also noticed on chilli and potato (Fig. 5 E) with 10-50% incidence. Purple blotch (Fig. 4H) of onion was noticed with 10-50% incidence followed by smudge (<10%). Collar rot of elephant foot yam (Fig. 5F) was also noticed in some areas with 10-50% incidence. Mango is susceptible to several diseases. Anthracnose is one of the most serious diseases in all mango growing regions of the world and it causes upto 39% loss in mango yield (Prakash, 2004). Floral malformation in contrast to vegetative one is more damaging and can cause the loss of upto 50-80% (Kumar *et al.,* 2011). Selvarajan *et al*. (2001) reported that the crop loss due to banana leaf spot ranged between 20-50%. In Bihar, about 55% of the area under susceptible cultivars was severely affected with *Fusarium wilt* and the estimated yield reduction in these areas was 50-70% (Mustaffa and Thangavelu, 2011). Papaya is susceptible to several diseases like root rot, foot rot, damping off, leaf spots, powdery mildew, anthracnose and stem end rot (Rawal, 2010). Wilt is one of the most important diseases of guava, especially in India (Misra, 2007) followed by anthracnose (Rahman *et al.,* 2003). Citrus canker is one of the most important diseases with economic importance in citrus affecting all types of important citrus crops (Das, 2003). Late blight caused by *Phytophthora infestans* is one of the most destructive diseases of tomato as well as potato worldwide causing significant economic losses annually (Nowicki *et al*., 2012). Ramesh (2008) recorded 30-100% incidence of bacterial wilt of tomato during the *Rabi* season. Das (1998) reported 15 to 50% yield losses in brinjal due to Phomopsis fruit rot. Amongst all the diseases of crucifers, black rot is caused by *Xanthomonas campestris* pv. *campestris* is the most destructive one causing heavy losses (Meenu *et al.*, 2013). *Alternaria brassicae* and *A. brassicicola* affects most cruciferous crops including cauliflower and cabbage (Jasalavich *et al*., 1995). Cucurbit crops are affected by viruses either transmitted by several vectors or through mechanical transmission worldwide (Velasco *et al.*, 2020). Yellow vein mosaic is a devastating disease of okra causing yield losses of upto 80-94% (Kumar *et al*., 2017). Fruit rot, anthracnose and die-back caused by *Colletotrichum capsici* can cause 10-54% yield loss in Chillies (Ramachandran and Rathnamma, 2006). Among the diseases, purple leaf blotch caused by *Alternaria porri* and Stemphylium leaf blight caused by *Stemphylium vesicarium*, are the major diseases of onion world-wide resulting in crop loss ranging from 30 to 100 per cent both in seed and bulb crop from year to year and are more prevalent in warm and humid environment (Suheri and Price, 2000a). Collar rot is a destructive disease of elephant foot yam; its 16.11% incidence was reported by Sahoo *et al.* (2016) in Odisha. Hence, the findings of earlier workers are quite supportive of the occurrence of diseases obtained in the present investigation.

Conclusion:

In the above investigation; the maximum incidence of foliar blight of wheat, sheath blight of rice, turcicum leaf blight of maize, mungbean yellow mosaic virus and Alternaria blight of mustard were recorded under field crops. In fruit crops; sigatoka disease of banana was noticed with the highest incidence followed by anthracnose/ die back and floral malformation of mango, wilt of banana, foot rot of papaya, anthracnose of guava and citrus canker. Diseases *viz.,* late blight, bacterial wilt, black leaf spot/ rot, leaf curl, yellow vein mosaic virus, die back and late blight were recorded with considerable incidences in tomato, brinjal, cauliflower, cucurbits, okra, chilli and potato, respectively.

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