Present Status of Major Pests and Diseases of Tomato and Chili in Bali

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ABSTRACT

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The research on the distribution of pests and diseases of tomato and pepper plants do to find out the latest situation on the type and spread of pests and diseases of those plants in the wet season in Bali. Methods of research were conducted by survey and identification method based on the symptoms of the disease in field and laboratory observations using microscope. The study was conducted in February 2012 in the planting center area of tomatoes and peppers in Ubud and Kintamani Bangli. The study was funded by AVRDC-The World Vegetable Center (USAID). The survey results show that the identification of major diseases of pepper plants is viruses, anthracnose (*Colletotrichum acutatum*) and *Phytophthora capsici*; whereas for tomato plants are dominated by Late Blight (*Phytophthora* sp.) and viruses. The diseases are found in almost all locations of planting tomatoes and peppers in Tabanan (Sandan, Bangli, Titi Galar, and Batu Sesa) and Bangli District (Katung, Bayung, Kedisan, and Abang Batu Dinding Wall). However each of the diseases attack intensity is different. The highest attack of anthracnose occurred at Galar Titi and Batu Sesa (Tabanan), while the highest virus infection was found in Kedisan and Abang Batu Dinding (Kintamani).

Keywords: pests and diseases, tomatoes, peppers

1. Introduction

Tomato and chili pepper are importance vegetable commodities in Bali. The consumer not just native people however also are distributed to the hotel and restaurant for tourists. However for production the farmer have a cereus problem. The total production of both commodities every year is reducing. The problem is caused by diseases and pests (Amanda, *et al.* 2011; Anonim, 2011; McGrath, 2011). The major disease was reported, in dry season 2011. On tomato, Tomato Yellow Leaf Curl Virus (TYLCV) and late blight (*Phytophthora* sp.) were the major diseases. Some foliar diseases caused by *Stemphyllium lycopersici*, *Alternaria solani*,

Clamdosporium fluva were also identified. On chili pepper, geminivirus, phytophthora blight and anthracnose were the major disease. Severe leaf spot caused by *Cercospora capsic*i and few fruit rots caused by *Erwinia carotovora* ssp. carotovora and *Phomopsis vexans* were also observed. Although the survey was conducted in dry season, many diseases favored in either cool-wet or warm-wet condition was severe, which were not expected (Zong-ming Sheu, 2011). Base on those we continue to observe the pests and diseases of tomato and chili pepper for wet season. The observation is conducted to collects the information and identify of major pests and diseases of tomato and chili in Bali on wet season 2012.

2. Material and Method

2.1. Survey Area

The observation is focused on the pests and diseases of tomato and chili. The field surveys were located on high land area in Tabanan and Bangli regency on February 2012. Elevation of observation is conducted on area around 700-1300 meter above sea level (MASL). The locations are a central of tomato and chili in Bali.

2.2. Samples Collection and Identification

Diagnosis and identification are conducted by the morphological symptom and microscopic method. Plant samples with typical symptoms of whitefly-transmitted geminiviruses, anthracnose, phytophthora blight, Tomato Yellow Leaf Curl Virus (TYLCV), and other diseases and pests are collected. The fungal and bacterial diseases were diagnosed by field symptoms, followed by microscopic observation and then growth and culturing in the laboratory of phytopathology, Faculty of Agriculture, Udayana University. The pathogens of chili pepper anthracnose and phytophthora blight were particularly isolated in order to final identification. PDA (Potato Dextrose Agar) medium is using for growth of fungal. The whitefly and Thrips samples are collected and put on tube contain alcohol 90%. The all field symptom are documented by digital camera for identification.

3. Result and Discussion

3.1. Diseases and Pests Distribution

The distribution of disease is illustrated in Table 1. In Tabanan regency the survey was conducted in Sandan, Bangli, Titi Galar, and Batusesa. On the other hand in Kintamani Bangli, the survey was done in Katung, Bayung, Kedisan, and Abang Batu Dinding. The distribution of pests and diseases basically is same in all area of survey however the intensity of damage is different.

Table 1. Diseases and Pests Distribution

Field No	Date	Crop	Location	Elevation (m)
1	28/2/2012	Tomato	Sandan/Tabanan	790
2	28/2/2012	Chili	Bangli/Tabanan	910
3	28/2/2012	Chili	Titi Galar/Tabanan	1000
4	28/2/2012	Tomato	Titi Galar/Tabanan	1015
5	28/2/2012	Chili	Batu Sesa/Tabanan	1195
6	28/2/2012	Tomato	Batu Sesa/Tabanan	1240
7	28/2/2012	Chili	Batu Sesa/Tabanan	1250
8	1/3/2012	Chili	Katung/Bangli	1030
9	1/3/2012	Chili	Bayung/Bangli	1125
10	1/3/2012	Tomato	Bayung/Bangli	1135
11	1/3/2012	Tomato	Buahan/Bangli	1055
12	1/3/2012	Chili	Abang Batu Dinding/Bangli	1070
13	1/3/2012	Chili	Abang Batu Dinding/Bangli	1070
14	1/3/2012	Tomato	Kedisan/Bangli	1055

3.2. Pests and Diseases Situation in Bali

The major pests and diseases were collected from the vegetable center in Bali. The list of disease and pests are illustrated on Table 2. In Tabanan, samples were collected from Sandan, Bangli, Titi Galar and Batu Sesa and in Kintamani Bangli, survey focused in Katung, Bayung, Kedisan and Abang Batu Dinding. The major diseases and pests were identified:

(1) *Colletotrichum* sp. associated with pepper anthracnose diseases. Anthracnose is caused by *Colletotrichum* sp. fungal (Than, *et al.* 2008). The sample was collected from chili in Tabanan and Kintamani. In the field the morphological identification was conducted and finally the sample was carried to laboratory for microscopic identification. Base on the method, *Colletotrichum* sp. was identified as *Colletotrichum acutatum* (Fig. 3). The infection of Colletotrichum is very high in Titi Galar and Batu Sesa (Tabanan) around 90% rate of infection.

(2) *Phytophthora capsici* from chili pepper. Base on the AVRDV identification guide and experimental report previously the Phytophthora symptom from Tabanan and Kintamani Bangli was identified as *Phytophthora capsici* (Amanda, 2011). In this survey the infection of Phytophthora is moderate, therefore the damage is low.

(3) Viral samples from tomato and chili pepper. The viral symptom was found in all area of tomato and chili pepper. However in Kintamani (Abang Batu Dinding) the viral was found as a major disease. The final identification of viral sample will be conducted in AVRDC Taiwan.

(4) Late blight (LB). The late blight disease was identified causing by *Phytophthora* sp. (McGrath, 2010). The damage of late blight is very high, especially in Bayung (Kintamani Bangli). To control the late blight, farmer use fungicide however is not completely reduce the damage. The damage of late blight average 90%, therefore the farmer is completely lost of yield.

(5) Insect samples from tomato and chili pepper. The population of whitefly (*Bemisia tabaci*) is donated in Kedisan (Kintamani) on tomato and for the thrips the population is high on chili in Katung (Kintamani). Four whitefly and thrips samples were collected from Tabanan and Kintamani were imported to AVRDC. The final identification and characterization will be conducted in AVRDC.

The high infection of disease possible is effected by the environmental condition. The wet and the high moisture is good condition for grow and ability for infection of fungi. The spore of fungi will be germinated when the moisture is high. On the other hand the infection of virus is related with the abundant of vector (whitefly and thrips), this condition was found in Kedisan (Kintamani, Bangli) the high of viral disease (Tomato Yellow Leaf Curl Virus (TYLCV)) is following by the high abundance of whitefly (Table 1 and 2). The vector is carried a viral to moving from one plant to the other (Bel-Kadhi, *et. al*, 2008; Riley, *et al*. 2011).

Table 2. Diagnosis of Major Diseases and Pests of Tomato and Chili

Field	Crop	Scientific name	Variety	Disease/pest observed*)	Major diseases
1	Tomato	*Solanum lycopersicum*	Lentena	LB, Virus, Whitefly	LB
2	Chili	*Capsicum frutescens*	Rawit	PB, AN, Virus	Virus, AN
3	Chili	*Capsicum frutescens*	Rawit	AN, Virus	Virus
4	Tomato	*Solanum lycopersicum*	Marta	LB, Virus, Whitefly	Virus
5	Chili	*Capsicum annuum*	large cayenne type	AN, Virus	AN, Virus
6	Tomato	*Solanum lycopersicum*	Carry	LB, Virus, Whitefly	LB
7	Chili	*Capsicum annuum*	large cayenne type	PB, AN, Virus, Thrips	Virus
8	Chili	*Capsicum frutescens*	Rawit	PB, Virus, Thrips	Virus
9	Chili	*Capsicum annuum*	Strada	PB, Virus, Thrips	LB
10	Tomato	*Solanum lycopersicum*		LB, Virus, Whitefly	LB
11	Tomato	*Solanum lycopersicum*		LB, Virus, Whitefly	LB, Virus
12	Chili	*Capsicum annuum*	Hot Chili	AN, Virus, Thrips	AN
13	Chili	*Capsicum frutescens*	Rawit	Virus, AN, Thrips	Virus
14	Tomato	*Solanum lycopersicum*		LB, Virus, Whitefly	Virus

*) Phytophthora blight (PB); Anthracnose (AN); Late blight (LB)

A) B) C)

Figure1. Field Symptoms of Diseases on Chili.
Symptom of viral (A), Symptom of anthracnose (B), stamp of chili attract by Phytophthora (C).

A) B) C)

Figure 2. Field Symptoms of Diseases and Pest of Tomato.
Symptom of viral (A), Symptom of Phytophthora Late Blight (B), Adult of whitefly (*Bemisia tabaci*) (C).

A) B)

Figure 3. Field Symptoms and Microscopic Observation of Anthracnose on Chili.
Field symptom (A), Microscopic observation of *Colletotrichum acutatum* (B).

4. Conclusion

The distribution of pests and disease basically is same in all area of survey however the intensity of damage is different. Anthracnose (AN); Phytophthora blight (PB); and viral are a major disease were found on chili, and Late blight (LB) and Tomato Yellow Leaf Curl Virus (TYLCV) the major disease on tomato. The abundance of viral disease was found in Abang Batu Dinding (Kintamani), and infection of anthracnose is high in Titi Galar and Batu Sesa (Tabanan).

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