

**CLUBROOT OF CRUCIFERS AND CULTURAL PRACTICES:  
A CASE STUDY IN BHAKTAPUR AND KAVREPLANCHOK  
DISTRICTS, CENTRAL NEPAL**

**A Dissertation submitted to  
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For the Partial Fulfillment of the Requirements for  
Masters of Science in Botany**

**Submitted by  
Dipendra Karki  
Roll Number 33/058-059  
Symbol No. 909  
T.U. Regd. No. 5-1-049-0730-96**

**CENTRAL DEPARTMENT OF BOTANY  
TRIBHUVAN UNIVERSITY  
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2009**



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INSTITUTE OF SCIENCE AND TECHNOLOGY  
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*Ref. No.*

**Kirtipur, Kathmandu  
Nepal**

## RECOMMENDATION

This is to certify that Mr. Dipendra Karki has carried out the dissertation work entitled "CLUBROOT OF CRUCIFERS AND CULTURAL PRACTICES: A CASE STUDY IN BHAKTAPUR AND KAVREPLANCHOK DISTRICTS, CENTRAL NEPAL" under my supervision. The entire work is based on the collection of specimens as primary data by the student. This result has not been submitted elsewhere for any other academic degrees. I, therefore, recommend this dissertation to be accepted for the partial fulfillment of Masters Degrees in Botany from Tribhuvan University, Nepal.

Date: 27 August, 2009

.....

**Prof. Dr. D. D. Shakya**

**Supervisor**

Professor

Central Department of Botany

Kirtipur, Kathmandu

Nepal



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## LETTER OF APPROVAL

This is to certify that the dissertation work entitled "CLUBROOT OF CRUCIFERS AND CULTURAL PRACTICES: A CASE STUDY IN BHAKTAPUR AND KAVREPLANCHOK DISTRICTS, CENTRAL NEPAL" submitted by Dipendra Karki has been accepted as a partial fulfillment of Masters Degree of Botany.

Date: 27 August, 2009

### EXAMINATION COMMITTEE

#### Supervisor

.....  
Prof. Dr. D. D. Shakya  
Central Department of Botany  
Tribhuvan University  
Kirtipur, Kathmandu

#### Head of Department

.....  
Prof. Dr. K. K. Shrestha  
Central Department of Botany  
Tribhuvan University  
Kirtipur, Kathmandu

#### External Examiner

.....  
Prof. S.C. Singh  
Professor of Plant Resources  
Research Centre for Applied Science and Technology  
Tribhuvan University  
Kirtipur, Kathmandu

#### Internal Examiner

.....  
Dr. C. P. Pokhrel  
Central Department of Botany  
Tribhuvan University  
Kirtipur, Kathmandu

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## ABSTRACT

The clubroot disease of the crucifers is caused by the fungus *Plasmodiophora brassicae*. It is the most devastating disease of *Brassica* crops worldwide. The present study was carried out to observe the disease occurrence and cultural practices adopted by the local farmers of Tukucha Nala VDC of Kavreplanchok District and Sudal and Tathali VDCs of Bhaktapur District in the year 2009.

Primary and secondary data were collected by different tools and procedures. Altogether 45 monitoring plots of 5m<sup>2</sup> (total area coverage =375 m<sup>2</sup> / 3.75 ha) were established in the crucifer growing site (mainly cabbage and cauliflower) of each VDC. Plots were monitored from early transplanting of seedlings stage to harvesting stage. In total 663, 665 and 663 seedlings were observed from Tathali, Sudal and Tukucha Nala VDC respectively. Numbers of healthy plants (on the basis of morphological characters and farmers view on disease) remains till harvesting plots were 594 (89.55%), 594 (89.31%), 597 (90%) respectively. From this study it was found that disease intensity is high in Sudal 71 (10.69%) in comparison with Tathali 69 (10.45%) and Tukucha Nala 66 (10%).

Detailed soil analysis was carried out in laboratory. Twelve soil samples were collected from the experimental field, four from each VDCs. Among them 3 soil samples were collected from diseased prone areas and 1 from diseased free area of plantation site. Different soil parameters like pH, organic matters, available nitrogen, available phosphorous, available potassium, Cations exchange capacity like Calcium, Magnesium, Sodium, Potassium and Texture of the collected soils were measured. The soil in infected areas is found to be acidic in nature, their pH varying from 4.5- 5.0.

Seventy five local farmers (25 from each site) were interviewed by structured questionnaires regarding club root disease in local level. Study revealed that the disease observed in the area since last 5 years and severity is increasing day by day causing significant loss in the yield of crucifers, mainly cauliflower and cabbage. According to local respondents loss due to this

disease in the area of experimental field (375 m<sup>2</sup>) Sudal, Tathali and Tukucha Nala was 593kg, 513 kg and 314 kgs of cabbage and cauliflower in the year 2065.

Majority of the respondents were practicing lime water and chemical treatment methods for the control of club root in local area. They were using different chemicals like Krilaxyl, Benomyl, Derosal and Bavistin for the control. They were also using extract of *Artemisia vulgaris* and mustard cake. Among the fungicides lime water with Bavistin was found more effective.

*Plasmodiophora brassicae*, causal agent of clubroot disease of crucifers, has tolerant resting spores that permit its survival in the absence of a host plant. The resting spores are expected to germinate when triggered by specific substances. This could be the reason that the production loss is increasing in research sites. More intensive research works must be carried out to find out possible eco-friendly and economic control measures and in the mean time awareness programs should be lunched to enhance the knowledge on this disease.

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## LIST OF ABBREVIATIONS

%	-	percentage
µm	-	micron meter
°C	-	degree Centigrade
asl	-	above sea level
CDB, TU	-	Central Department of Botany, Tribhuvan University
DADO	-	District Agriculture Development Office
FAO	-	Food and Agriculture Organization
GO	-	Government Office
ICBN	-	International Code of Botanical Nomenclature
INGO	-	International Non Government Office
NARC	-	Nepal Agriculture Research Council
NGO	-	Non Government Office
Pl. n.	-	Plate number
spp.	-	species (Plural)
VDC	-	Village Development Committee