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Effect of Intercropping on the Incidence and Severity of *Phytophthora* Leaf Blight Disease in Taro (*Colocasia esculenta* (L.) Schott)

Taro [*Colocasia esculenta* (L.) Schott], a tropical aroid is an important staple or subsistence crop in the developing countries especially in African and South East Asian countries. It is widely cultivated in South Africa, Asia, Oceania, Central Africa, West Indies and the islands of the Caribbean and Central America (Chandra, 1984). Leaf blight caused by *Phytophthora colocasiae* Raciborski is the most important disease of taro. This disease was recorded for the first time by Butler and Kulkarni (1913) in India. Leaf blight has become a limiting factor for production in all taro-growing areas in India in moderate to severe form causing 25 to 50% yield loss every year (Jackson et al., 1980; Misra, 1997; Gadre and Joshi, 2003). Symptoms include small, water soaked, round or irregular, dark brown necrotic spots on the leaf lamina. The entire leaf area is damaged within few days. Intermittent rain and cloudy weather are ideal for rapid development of the disease (Misra, 1997). However, several farmers grow this crop under rainfed conditions and plant only in the month of June or July after the onset of monsoon in India. Moreover, occurrence of the disease in rainy season makes the fungicidal spray ineffective (Misra, 1999). Among the cultural practices, intercropping is also considered as one of the strategies in plant diseases management. The present investigations were undertaken to study the effect of intercropping on the incidence and severity of *Phytophthora* leaf blight in taro.

To study the effect of intercropping on the incidence and severity of *Phytophthora* leaf blight in taro, a field trial was conducted in R.B.D. with three replications at the Regional Centre of Central Tuber Crops Research Institute, Bhubaneswar during 1999 using highly susceptible cultivar 'Telia'. The plot size was 4.8 x 3.6 m, with a row spacing of 60 cm. There were five intercropping treatments viz., taro cultivar 'Telia' intercropped with black gram (*Vigna mungo*), green gram (*Vigna radiata*), cowpea (*Vigna unguiculata*), okra (*Abelmoschus esculentus*), and greater yam (*Dioscorea alata*). Apart from these intercropping treatments, a sole crop of taro (control) was also maintained for comparison. Recommended package of practices were followed for both taro and intercrops. Planting was done during the first week of June that coincided with the onset of South West monsoon. Observations on disease incidence were recorded in each plot by counting the infected as well as healthy plants in all the treatments. Disease severity was recorded on the basis of per cent leaf area affected. Observations were taken at 10 days interval starting from the first appearance of the disease symptoms (6th August) till the disappearance of the symptoms (5th October) in the experimental plots.

The disease incidence was minimum when taro was intercropped with okra followed by intercropping with green gram (Table 1). Maximum disease incidence was recorded in sole crop taro followed by intercropping taro with black gram, greater yam and cowpea. The disease incidence gradually decreased after 5th September. Madhukeshwara et al. (2003) reported that wilt incidence of pigeonpea was less due to intercropping with maize at optimum and sub-optimum fertilizer levels. Saikia et al. (2003) reported that highest corm yield of *Amorphophallus* was obtained in *Amorphophallus* + okra system followed by cowpea intercropping. Chauhan and Kumar (2004) also reported that wilt incidence was higher with sole crop of pigeon pea under field conditions but it was reduced due to intercropping with sorghum. Sunkad et al. (2005) recorded that bajra was the best intercrop with groundnut in reducing the peanut bud

necrosis disease incidence followed by sorghum and pigeon pea.

It is evident from Table 2 that intercropping in taro helped in reducing the disease severity. The disease severity was minimum when taro was intercropped with yam followed by green gram. It was highest in the control plot (sole crop taro) and in the plots where cowpea was the intercrop. Further, the disease severity did not differ significantly during peak periods of disease incidence (93.40 to 98.92%). The possible reason for the less disease incidence and disease severity in intercropping systems could be the change in the microclimate of the agro-ecosystem due to intercropping. Thus, intercropping might be unfavourable for the fungal pathogen due to various secondary plant substances secreted by the intercrops. Chaurasia (2006) reported that intercropping of chickpea with linseed and two sprays of carbendazim (0.2%) significantly reduced *Botrytis* gray mold severity of chickpea and increased grain yield of chickpea as well as linseed.

From the above discussion, it can be concluded that taro + okra and taro + greater yam intercropping systems can reduce the incidence and severity of *Phytophthora* leaf blight in taro and help in the effective management of this disease.

Table 1. Effect of intercrops on the incidence of *Phytophthora* leaf blight disease in taro

Treatments	Disease incidence (%)						
	6th Aug.	16th Aug.	26th Aug.	5th Sept.	15th Sept.	25th Sept.	5th Oct.
Taro (sole crop)	8.16	83.07	96.98	96.98	93.77	72.37	71.55
Taro + Black gram	16.31	84.25	97.7	96.55	91.18	84.32	71.11
Taro + Greater Yam	15.94	76.16	98.92	98.92	92.26	63.53	62.82
Taro + Cowpea	14.29	76.67	95.93	95.41	92.38	73.64	60.85
Taro + Green gram	17.52	62.31	95.44	95.44	94.14	66.3	52
Taro + Okra	11.75	69.1	93.4	94.41	92.39	57.84	44.16
S.E.	3.486	8.369	1.928	1.584	1.088	9.239	10.76

Table 2. Effect of intercrops on the severity of *Phytophthora* leaf blight disease in taro

Treatments	Disease severity (%)						
	6th Aug.	16th Aug.	26th Aug.	5th Sept.	15th Sept.	25th Sept.	5th Oct.
Taro (sole crop)	11.06	11.04	23.7	10.34	12.44	22.13	17.81
Taro + Black gram	6.11	10.48	15.96	7.14	9.74	12.79	9.02
Taro + Greater Yam	5.58	9.47	15.59	7.54	12.73	11.41	6.95
Taro + Cowpea	2.14	19.95	28.43	10.7	8.91	16.2	5.99
Taro + Green gram	9.5	8.38	20.75	10.17	7.47	11.79	4.87
Taro + Okra	11.85	17.47	21.44	9.18	4.75	8.39	8.59
S.E.	3.733	4.731	4.846	1.516	3.035	4.801	4.648

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Regional Centre of Central Tuber Crops Research Institute,
Dumduma, Bhubaneswar-751 019, Orissa, India

[1]Present address: Division of Crop Protection, CTCRI,
Thiruvananthapuram- 695 017, India

[2] Present address: Faculty of Agriculture and Regional Research Station (SKUAST-K), Wadura, Sopore-193 201, Jammu and Kashmir, India

Corresponding author: R.S. Misra, e-mail: rajshekarmisra@gmail.com

R. S. Misra [1]
S. K. Maheshwari [2]
S. Sriram
A. K. Sahu