

Short communication

## Mating-type distribution of *Phytophthora colocasiae* in Taiwan

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Cross-inducing species of *Phytophthora* require the presence of opposite mating types known as A<sup>1</sup> and A<sup>2</sup> of the same or different species for sexual reproduction (5, 7). Central America has been considered to be the center of origin of the late blight fungus, *Phytophthora infestans* (Mont.) de Bary and its host, potatoes (*Solanum tuberosum* L.) (9). At the center of origin, the ratio of A<sup>1</sup> and A<sup>2</sup> mating type of *P. infestans* was about 1:1, whereas in areas away from the origin A<sup>1</sup> is the dominant type (3). *Phytophthora cinnamomi* has been postulated to have its origin in Asia, based on the observation that plant species occurring in that region are mostly resistant or immune to attack by this fungus (2). Ko *et al.* (8) suggested that Taiwan is inside the center of origin of this fungus because both A<sup>1</sup> and A<sup>2</sup> mating types of *P. cinnamomi* were isolated from the same healthy, natural forest in the central part of Taiwan, and considerable variations in biological characters were noted among isolates of both A<sup>1</sup> and A<sup>2</sup> mating types of *P. cinnamomi* from Taiwan. They also found that the mating type ratio of *P. cinnamomi* isolated from Taiwan was close to 1:1 (8), whereas in areas away from the center A<sup>2</sup> is the dominant type (12, 13).

Asia has been postulated to be the center of origin of *Phytophthora colocasiae* Rac., the causal organism of leaf blight of taro [*Colocasia esculenta* (L.) Schott], by Ko (6) because it is the world's center of origin of many wild and cultivated taro (11) and the fungus is widespread in that region (1). Since *P. colocasiae* occurs in most taro fields in Taiwan, we surveyed the mating-type distribution of this fungus in this area, hoping that the results would provide indication whether Taiwan is inside the center of origin of this fungus.

Pieces (ca. 5×5 mm) of taro leaves and petioles infected with *P. colocasiae* were surface-sterilized with 0.1% sodium hypochlorite solution for 10 min, and placed on a selective medium (per liter: 5% V-8 juice, 50 mg Mycostatin, 100 mg Ampicillin, 10 mg pentachloronitrobenzene, 20 g agar) (8). After incubation at 24–30 °C for 2–4 days, mycelia from the edge of *P. colocasiae* colonies were transferred to 5% V-8 agar plates (per liter: 5% V-8 juice, 0.2 g CaCO<sub>3</sub>, 15 g agar). The mating type of each isolate was determined by pairing with an A<sup>1</sup> type (P991) and an A<sup>2</sup> type (P731) of *Phytophthora nicotianae* Van Breda de Haan var. *parasitica* (Dastur) Waterh. supplied by G. A. Zentmyer.

More taro plants are grown in the west than in the east of Taiwan. *Phytophthora colocasiae* was found in all the 15 counties on the island (Fig. 1). The fungus was present in 110 of 122 taro fields surveyed (Table 1). A total of 799 isolates of *P. colocasiae* was obtained from taro fields with *Phytophthora* leaf blight. All of them were similar in colony appearance and behaved as A<sup>2</sup> mating type. These results suggest that the fungus probably is not indigenous to Taiwan.

All four taro isolates of *P. colocasiae* from Asia reported previously were also A<sup>2</sup> type (4, 10). However, all 114 taro isolates of *P. colocasiae* from the different islands in Hawaii were A<sup>1</sup> type (6). Two isolates of *P. colocasiae* obtained from the rubber tree (*Hevea brasiliensis* Muell.-Arg.) in China were found to be neuter (4).

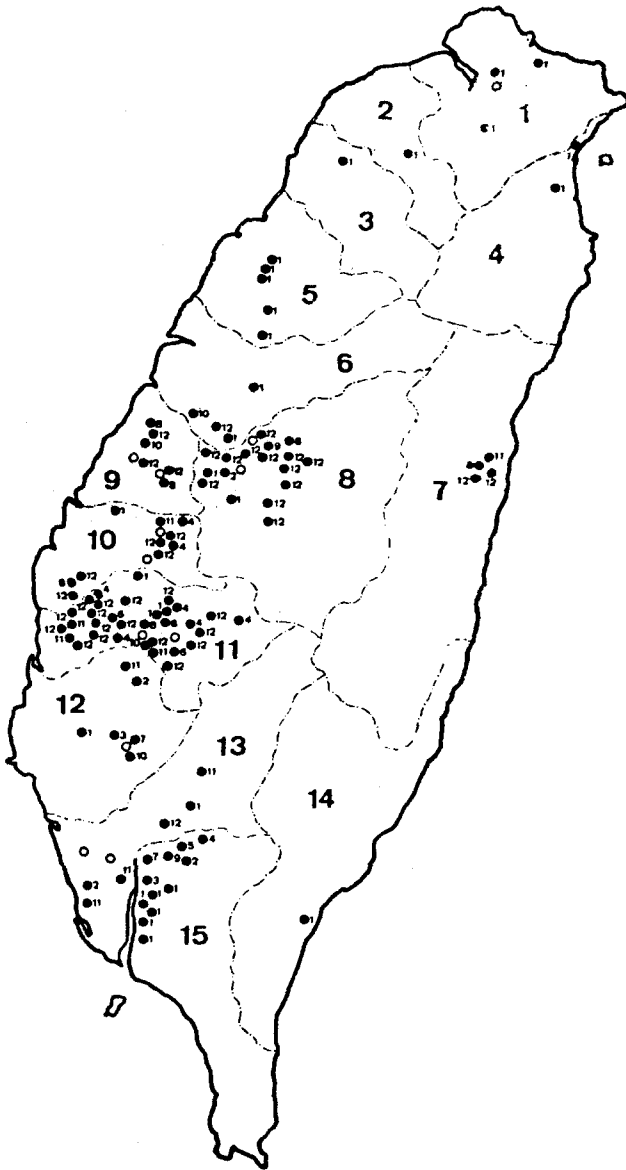


Fig. 1. Distribution of *Phytophthora colocasiae* in taro fields in Taiwan island which is 380 km long from north to south and with and east-west maximum width of 140 km. Solid dots indicate the location of taro fields where the fungus was isolated and the numbers by the solid dots indicate the number of isolates obtained from each field. Open circles indicate the absence of the fungus in the taro fields surveyed.

#### Acknowledgments

Journal Series No. 2976 of the Hawaii Institute of Tropical Agriculture and Human Resources.

Table 1. Isolation of *Phytophthora colocasiae* from taro fields in Taiwan.

County <sup>a</sup>	No. of fields surveyed	No. of fields with <i>P. colocasiae</i>	No. of isolates obtained
(1) Taipei	4	3	3
(2) Tao Yuan	1	1	1
(3) Hsin Chu	1	1	1
(4) I Lan	2	2	2
(5) Miao Li	5	5	5
(6) Taichung	4	4	24
(7) Hua Len	4	4	43
(8) Nan Tow	19	17	165
(9) Chang Hua	8	6	62
(10) Yun Lin	12	10	88
(11) Chia Yi	34	32	286
(12) Tainan	7	6	34
(13) Kao Hsiung	8	6	48
(14) Taitung	1	1	1
(15) Pingtung	12	12	36
Total	122	110	799

<sup>a</sup> County numbers correspond to numbers in Fig. 1.

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