

CHILI PEPPERS IN SINGAPORE

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Singapore is situated on the southern tip of the Malay Peninsula, in Southeast Asia between Sumatra and Borneo, where the Andaman Sea, the Java Sea and the South China Sea meet (Fig. 1). Since the 17th century, Singapore (then called Johore) has been Southeast Asia's busiest entrepôt, serving as an economic bridge between East and West.

Singapore, Malaysia, Indonesia and Thailand cuisines use many chilis and so there are very hot. However, the history of chili has been short; it has been dispersed in Southeast Asia after the age of Columbus. In 1641 the Dutch occupied Malacca near Johore. The chili pepper must have been introduced there by the Dutch people about that time because they tried to develop many types of trade between East and West.

This article will show what kinds of chili people of these areas use and will examine the genetic analyses involved by comparison with other Asian areas.



Fig. 1. A map of the Singapore area.

Materials and Experimental Methods

The chili peppers were collected at Singapore City, Republic of Singapore; at Phuket, Thailand, and in Ibaragi, Japan, as is shown in Fig. 2.

Collected Materials

Capsicum annum L. var. *longrum* Sendt.

Local name: Chilly Red. Collected at Singapore City.

Capsicum annum L. var. *grossum* Sendt.

Local name: Chilly Green. Collected at Singapore City.

Capsicum microcarpum D. C.

Local name: Chilly Padi, Bird Pepper.

Collected at Singapore and at Phuket.

Capsicum annum var. *acuminatum* Bailey

Local name: Japanese Chili, Taka-no-tsume.

Collected at Hakota, Ibaragi, Japan

Fresh materials were prepared from fruits and seeds for the use of isozyme analysis by means of electrophoresis. The sample materials (50 mg) taken from each locality used smashed with the extract solution (potassium phosphate buffer, 0.05 M, pH 7.0). After centrifugation by means of a disposable microcentrifuge tube, crude extracts of the sample were put in thin-layer acrylamide gel. Thin-layer acrylamide slab gel (1 × 140 × 140 mm) was then used for the electrophoresis experiments. Ten columns (1 × 4 × 15 mm) were prepared, and the extract samples were

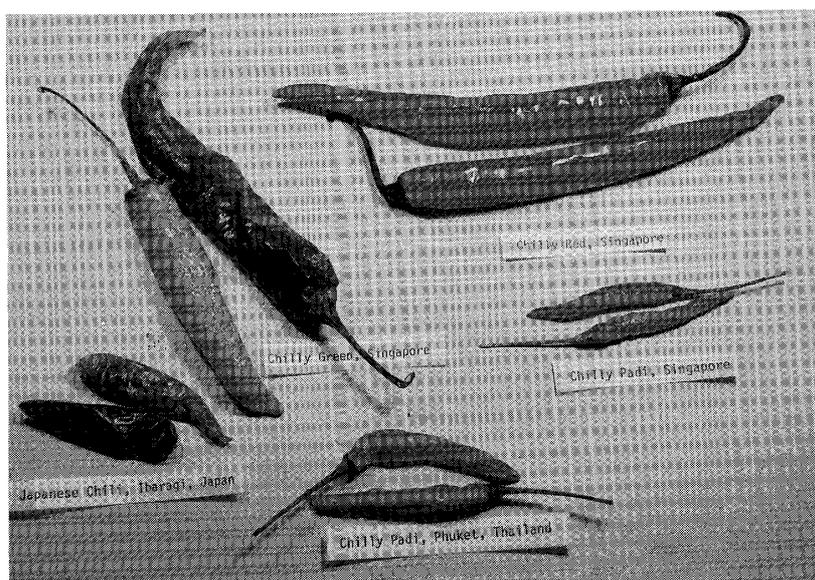


Fig. 2. Photographs of Asian Chili Peppers.



Fig. 3. Isozyme banding phenotypes of Esterase in Asian Chili Peppers.

placed in the columns by the use of micropipet. The electrode solution consisted of 0.02 M HCl and 0.02 M ethylenediamin. The electrical conditions were 30 mA for 90 minutes. The dye solution for the staining of the Esterase enzyme used the fast blue RR salt dissolved in a $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ KH_2PO_4 solution (1/15 M phosphate buffer, pH 7.0). The substrate buffer was a mixture of α -naphthyl acetate and acetone. The gel was soaked five minutes in the staining buffer before being placed in the substrate buffer. Peroxidase activity was stopped by the use of 7% acetic acid.

Results and Discussion

Fig. 3 shows the findings on the peroxidase bands of the Esterase enzyme for the materials of five localities.

Singapore people commonly use three kinds of chili Peppers: *Capsicum annum* var. *longrum* (Chilly Red) and var. *grossum* (Chilly Green) and *Capsicum microcarpum* (Chilly Padi). They show very different banding patterns. Chilly Padi and Chilly Red are somewhat similar, but Chilly Green is very different, showing only two bands.

It is interesting that the Chilly Padi from Singapore and that from Phuket were different (Singapore-3 bands; Phuket-4 bands), although they were of the same species. It seems likely that this species (*Capsicum microcarpum*) is clearly differentiated in this area. This species contains much capsaicin and is very hot, more so than *Capsicum annum* var. *longrum*; therefore, the people in this area like this chili pepper.

The Japanese chili (common name: Taka-no-tsume) shows 5 bands. This means that the Japanese people use a different chili. The Japanese

got it a long time ago by trading with Southeast Asia through the Dutch and the Spanish. However, the Japanese have selected a different strain of chili pepper because Japanese do not like very hot food and because they live in a cooler region than the Singapore area.

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