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Berberis ALKALOIDS.
XL. AN INVESTIGATION OF THE ALKALOIDS OF *Berberis thunbergii*

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Continuing an investigation of alkaloids from plants of the *Berberis* genus, we have studied for the first time the alkaloid composition of the Japanese barberry *Berberis thunbergii* DC, introduced into the territory of the Namangan oblast of Uzbekistan. The raw material was gathered in the fruit-bearing phase in July, 1995.

Berberis thunbergii is a thorny shrub 2-3 m high that is widely distributed in Japan [1]. Eight isoquinoline alkaloids have been isolated previously from the wild form of this plant [2, 3].

Comminuted air-dry stems of *B. thunbergii* (1.15 kg) were extracted with ethanol by the procedure of [4]. The leaves (0.8 kg) and fruit (0.1 kg) were extracted with chloroform. Individual bases were obtained by separating the mixture of alkaloids on a column of silica gel and alumina and were identified by direct comparison with authentic specimens and from spectral characteristics. The percentages of the total and of the individual alkaloids were calculated on the weight of the air-dry plant (Table 1).

It must be mentioned that in the fruit-bearing period the total amount of alkaloids in the stems was considerably smaller than in the other organs. In this phase the alkaloids probably accumulate in the fruit and leaves, and the fruit contains the highest total amount of bases (0.83%). It is interesting that in the total quaternary alkaloids of the stem the main one is palmatine, and not berberine as in many other species of barberry.

Thus, nine alkaloids have been isolated from various organs of cultivated *B. thunbergii*. Of these, it is the first time that glaucine, isocorydine, thalicmidine, heliamine, and palmatine have been isolated from this species.

TABLE 1

Plant organ	Sum of the alkaloids	Main alkaloids, %	Minor alkaloids
Stems	0.13	Oxyacanthine, 0.03; palmatine, 0.02	Berberine, berbamine, glaucine, isocorydine, thalicmidine
Leaves	0.13	Thalicmidine, 0.03	Oxyacanthine, isocorydine, heliamine, berberine
Fruit	0.83	Oxyacanthine, 0.25; isotetrandrine, 0.15	Thalicmidine

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