

INVESTIGATION OF THE ALKALOIDS OF FAR-EASTERN  
REPRESENTATIVES OF *Thalictrum*.

ALKALOIDS OF *Thalictrum strictum*

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We have investigated the alkaloid composition of the epigeal and hypogeal organs of far-eastern populations of the Asian species *Th. strictum* Ledeb. [1], which belongs to the cycle *Th. simplex* L., S. L. In the Far East, *Th. amurense* Maxim. belongs to the same group, but this species flowers a month later than *Th. strictum* and also differs by the structure of the root system, the size of the leaf-bearing stems, and its ecology. *Th. strictum* is associated with river flood plains and generally grows in the Maritime Territory under a canopy of *Chosenia arbutifolia*. This has also been observed for the Korean peninsula [2]. *Thalictrum strictum* was collected in the flood plain of the R. Shkotovka in the environs of the settlement of Shkotovo, Shkotovo region of the Maritime Territory. The leaves and epigeal part (herbage) were taken for investigation in the second half of June, 1973, in the budding phase, and the rhizomes, roots, and seeds in September, 1973.

The bases were extracted by the usual method (Table 1). We studied in most detail the total bases of the epigeal part. The alkaloids were transferred from a chloroform extract into 10% sulfuric acid. The sulfate that precipitated was separated off and suspended in a solution of caustic soda, and the bases were extracted with chloroform. The solvent was evaporated off. Recrystallization of the residue obtained from ethanol gave a crystalline base. Investigations of its UV, mass, and NMR spectra showed its noraporphine nature. The results of a comparison of the facts obtained with those in the literature permitted the

TABLE 1. Alkaloids of *Th. strictum*

Plant organ	Amount of total alkaloids, % on the weight of the air-dry raw material	Alkaloids isolated
Seeds	0.25	Thalicminine
Roots and rhizomes	0.15*	Unidentified base A
Leaves	{ 0.25	Thalicminine
	{ 0.07†	O-Methylcassyfiline
Epigeal part	{ 0.20	Thalicminine, thalicmine
	{ 0.03†	O-Methylcassyfiline, argemonine, and uniden- tified base B

\*Only tertiary bases  
†Sulfate.

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assumption that the base was O-methylcassyfiline [3] (northalicmine). To confirm this, we obtained the N-methyl derivative and identified it by direct comparison with an authentic sample of thalicmine. Thus, the base that we isolated is O-methylcassyfiline, and this is the first time that it has been found in plants of the genus *Thalictrum*. The acid extract after the separation of the sulfate was made alkaline with ammonia and the bases were extracted with ether and then with chloroform. Chromatography of the ether-soluble fraction on a column of alumina with subsequent preparative separation on plates with a fixed layer of silica gel gave thalicmine, an unidentified base B, and a crystalline optically active alkaloid with mp 147-148°C. On the basis of a study of its UV, mass, and NMR spectra and a comparison of the results obtained with information in the literature, the latter was identified as (-)-argemonine [4]. This is the first time that argemonine has been isolated from plants of the genus *Thalictrum* growing on the territory of the USSR.

When the combined chloroform-soluble bases were treated with methanol, thalicminine [5] was obtained.

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