

ADDITIONAL ALKALOIDS OF *THALICTRUM JAVANICUM*

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*Thalictrum javanicum* Bl. is an erect perennial herb indigenous to the Himalayas of India and occurring on the Nilgiris, Pulneys, and Anamalais above 6000 feet (1). Although various *Thalictrum* species have been used as medicinals in Indian folkloric medicine, the only reference to previous work on *T. javanicum* reported the isolation of the protoberberine alkaloids palamatine, berberine, columbamine, jatrorrhizine, and demethyleberberine, and the quaternary aporphine alkaloid magnoflorine from the stems and roots (2). The genus *Thalictrum* continues to be a profoundly abundant source of benzyloisoquinoline-derived alkaloids with approximately two hundred different alkaloids, many with interesting biological activities, having been isolated and identified by the end of 1983 (3). An investigation of the alkaloid-containing fractions of the roots of *T. javanicum* via repeated column chromatography led to the isolation of the nonquaternary alkaloids oxyberberine, thalrugosaminine, rugosinone, and thalisopine plus the quaternary alkaloids berberine and thalifendine. This is the first report of the presence of nonquaternary alkaloids in this species.

## EXPERIMENTAL

**PLANT MATERIAL.**—The plant material was collected by Dr. M. Sahai in September 1980, from the Ranikhet area, U.P., and identified by Dr. P.P. Joshi, Survey of Medicinal Plant Unit, CCRAS, Tarikhet, U.P. An herbarium specimen is on deposit in the Department of Medicinal Chemistry, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India.

**EXTRACTION AND ISOLATION.**—Powdered, dried roots (2 kg) were extracted by percolation with EtOH (2 × 10 liters). The extract was concentrated to a syrup, stirred with aqueous citric acid (7%), filtered, and filtrate extracted with CHCl<sub>3</sub> (Fraction A). Repeated chromatography of Fraction A (9 g) over Al<sub>2</sub>O<sub>3</sub> afforded oxyberberine (30 mg) (4), thalrugosaminine (50 mg) (4), and berberine (600 mg) (5). The remaining citric acid solution was basified, extracted with CHCl<sub>3</sub>, and chromatographed over Si gel and Al<sub>2</sub>O<sub>3</sub> to yield rugosinone (25 mg) (5), thalisopine (40 mg) (4), berberine (200 mg) (5), and thalifendine (60 mg) (5). The alkaloids were identified by direct comparison with authentic samples or comparison with literature data using accepted techniques (uv, ir, <sup>1</sup>H nmr, ms, mp, [α]<sub>D</sub>) (4, 5). Full details of the isolation and identification of the alkaloids are available from the senior author upon request.

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