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considerable doubt concerning its classification at that time. The authors are indebted to B. L. Robinson, of the Gray Herbarium, and H. Harms and O. E. Schulz, of the Botanisches Museum, Berlin, for having identified this sweet clover since as an annual flowering form of the typically biennial Melilotus dentata (W. K.) Pers. Schulz describes the species as occurring sparingly from central Europe eastward to central Asia, usually on salty soils. It does not appear to have become naturalized in America.

The non-bitter condition of this one stock of M. dentata led us to assemble an extensive collection of the species for further study. We are indebted mainly to several European correspondents for seed. Examination of 28 different lots (27 of which were biennials) mostly from central Europe, but a few from Russia and one from Mongolia, has shown that all are free of the characteristic bitter taste of the common sweet clovers, M. alba and M. officinalis. Apparently M. dentata as a species is typically non-bitter. Suvorov's3 report on the Russian species of sweet clover bears out this conclusion.

As the bitterness of the common sweet clovers is due mainly, if not entirely, to coumarin and closely related substances, it was anticipated that M. dentata would differ in its content of these compounds. The analytical findings show clearly that this is the case. Roberts and Link have recently developed a micro-method, to be described elsewhere, for estimating coumarin, melilotic acid and coumaric acid, which not only permits the determination of these substances separately but to an accuracy of about 0.001 per cent. on the dry basis. The earlier methods of Obermayer,4 Kanewskaja and Fedorowa,5 Duncan and Rustman6 and Clayton and Larmour7 severally encounter various analytical difficulties, such as failure to separate the three constituents, inclusion of other phenolic substances in the coumarin fraction and interference by plant pigments. These disadvantages are largely overcome by the procedure used in the present investigation.

Using the highly refined method of Roberts and Link no coumarin, melilotic acid or coumaric acid were detected in the vegetative tissues of M. dentata at the flowering stage. Seven different races were tested as follows: F.P.I. 90753, Botanic Garden, Peiping, China; Botanic Garden, Copenhagen, Denmark; Thüringen and Saxony, Germany; Moravia, Czechoslovakia; Saratov and West Siberia, U.S.S.R.; Altai Mountains, Mongolia. All these stocks, except those from the botanical gardens and possibly that from Saratov, represent the forms indigenous to these respective regions, according to the information supplied by the correspondents to whom we are indebted for the seed. It is probable, therefore, that if these substances are present at all in the leaves and stems of M. dentata, the amounts are less than 0.001 per cent.

A sample of common yellow sweet clover, M. officinalis, analyzed at the same stage of development, was found to contain 0.65 per cent. coumarin, 0.25 per cent. melilotic acid and 0.036 per cent. coumaric acid. The corresponding values for a commercial strain of common white sweet clover, M. alba, were found to be 0.36 per cent., 0.27 per cent. and 0.048 per cent. The common sweet clovers vary rather widely in composition from strain to strain and at different stages of development so that the above results are not necessarily representative of the respective species.

A small amount of coumarin is present in the seed of M. dentata. Analysis of three of the above-mentioned stocks (Peiping, Copenhagen and Moravia) showed 0.021 per cent., 0.074 per cent. and 0.040 per cent., respectively, on the dry basis. A sample of M. officinalis seed run concurrently was found to contain 0.63 per cent. coumarin and an M. alba lot, 0.46 per cent. It will be noted that these values are roughly ten times as high as those for M. dentata. That the material determined as coumarin in the analysis of the seed is actually that substance was shown by the isolation of 25 mg of pure coumarin from 31 g of M. dentata (Copenhagen strain) seed. The melting point of the isolated material and the mixed melting point with pure coumarin were 71.0-71.5°C, the same as that for pure coumarin. The iodine-potassium iodide test and certain coupling tests were positive, and the chemical characteristics exhibited during the isolation were identical with those of coumarin. The regular method of analysis indicates that if any melilotic acid and coumaric acid occur in the seed of M. dentata the amounts are extremely small.

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3 Semenovodstvo, No. 2 (quoted from Herb. Abstr. 5: 153).
5 Ibid., 93: 176-180.
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