

### The Hypnotic Constituent of *Stipa vaseyi*, Sleepy Grass

The plant, *Stipa vaseyi*, also known as *Stipa viridula*, *Stipa viridula* var. *robusta*, and commonly as sleepy grass, has been reported<sup>1-3</sup> to produce a hypnotic effect in animals, particularly horses which graze on the grass. The best substantiated work is that of MARSH and CLAWSON<sup>1</sup> who concluded that the plant, either green or dry, produces a distinctly hypnotic effect in horses. MUENSCHER<sup>3</sup> states that chemical examination has not revealed any toxic substances.

We wish to report the isolation, identification, and some of the pharmacological properties of diacetone alcohol, an active constituent of sleepy grass.

Samples of sleepy grass were collected from mountain valleys on the Mescalero Apache Indian Reservation near Ruidoso (New Mexico). The dried grass was powdered and extracted with a sequence of non-polar to polar solvents. The ether, acetone, and methanol extracts which were tested in mice and rats all showed activity. Distillation of the crude extracts through a spinning band column gave a colorless liquid, b.p. 45–46° (6 mm), which had all the activity of the crude extracts. The active material, diacetone alcohol, was identified by a comparison of b.p., infrared spectra, m.p., m.m.p. of the DNP derivatives (m.p. 203–204°), and pharmacological properties of the active principle with known diacetone alcohol. It is not understood why earlier investigators failed to isolate diacetone alcohol from the plant, unless the low yield (1.2% on a dry weight basis) was responsible.

Preliminary pharmacological studies show that diacetone alcohol has central depressant properties. Other investigators have also reported on some central effects of this compound<sup>4,5</sup>. The central nervous system effects in the present study were observed in both rats (Sprague-Dawley males) and mice (Carworth Farms males).

In rats we noted that doses of 0.1 to 0.2 ml (93–186 mg) per 250 g produced depression which was most conspicuous if the animal was not stimulated; the treated animals

displayed a great reduction in motor activity and a closing or semi-closing of the eyelids. Upon stimulation by either touch or sound, the animals responded with an increase in motor activity and appeared normal. Higher doses (0.5 ml/250 g rat), in contrast, produced what appeared to be a mixture of depression and stimulation. The animals exhibited a marked increase in motor activity, including running, and a moderate degree of ataxia.

In mice 0.1 to 0.2 ml/25 g produced a conspicuous respiratory as well as motor depression. Lower doses (0.05 ml) produced a curious posture: the animals stretched and arched their backs concavely, so that their abdomens touched the bottom of the cage<sup>6</sup>.

*Zusammenfassung.* Der aus *Stipa vaseyi* isolierte wirk-same Bestandteil (depressive Wirkung auf das Zentral-nervensystem von Tieren) wurde chemisch und pharma-kologisch als Diacetonalcohol identifiziert.

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- <sup>2</sup> A. W. SAMPSON and H. E. MALMSTEN, *Stock-Poisoning Plants of California*, Univ. of Calif. Agr. exp. Sta. Bull. No. 593, 74 (1935).
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- <sup>6</sup> This investigation was supported by U.S. Public Health Service research grant NB-04313-1, National Science Foundation undergraduate summer research award, and National Institutes of Health research career award 5-K3-NB-8641-02.

### Protection of *Vicia faba equina* Against X-Rays by Serotonin<sup>1</sup>

It seemed interesting to us to examine the radio-protective effect of serotonin on plants. To this end we used the germinating beans of *Vicia faba equina*. We made two series of experiments: (1) as preliminary experiments we irradiated germinating beans of *Vicia faba* with increasing doses of X-rays, as JÜNGLING et al.<sup>2</sup> had already done in 1920, and GLOCKER, HAYER and JÜNGLING<sup>3</sup> in 1929, in their studies of dosage and the biological effect of X-rays. The test which we used in the course of these experiments (prompted by the work of JÜNGLING et al.<sup>2</sup>) was the appearance and the growth of secondary roots in germinating *Vicia faba*. (2) We tried to show, in *Vicia faba*, the protective effect of cysteamine already established by BACQ et al.<sup>4-7</sup> on the pea (Express of Alaska) and the effect of serotonin.

*First series of experiments.* In the first experiments we sought to find out which was the dose of X-rays necessary in *Vicia faba* to prevent the appearance of secondary

roots (Figure 1). From these results it is evident that the appearance and growth of accessory roots diminishes progressively in proportion to the dose of X-rays applied. Plants which have received 400 R do not develop accessory roots. We therefore used this dose for experimenting on the protection of plants against irradiation.

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