

SHORT COMMUNICATION

COMPARISON OF THE GRAIN STEROL FRACTIONS OF CULTIVATED AND WILD OAT SPECIES

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(Received 29 June 1968)

**Abstract**—Sterol fractions from grain of cultivated oat (*Avena sativa* L.) and two species of wild oat (*A. fatua* L. and *A. ludoviciana* Dur.) have been compared and found very similar.

INTRODUCTION

THE STEROL fraction from grain of *Avena sativa* L. (cultivated oat) has been extensively studied<sup>1-3</sup> and has been shown to contain a complex series of minor components.<sup>3</sup> Studies have shown differences in dormancy between seed from some cultivated and wild species of *Avena*<sup>4</sup> and it was decided to look for any difference in the sterol fractions of these seeds.

RESULTS AND DISCUSSION

Table 1 lists the sterol composition for *Avena sativa* L. (cv. Star), *A. fatua* L. (spring wild oat) and for "proximal" and "distal" seed of *A. ludoviciana* Dur. (winter wild oat). The

TABLE 1. PERCENTAGE COMPOSITION OF THE STEROL FRACTION OF GRAIN OF *Avena* spp.

Sterol	<i>A. sativa</i> L. cv. Star	<i>A. fatua</i> L.	<i>A. ludoviciana</i> Dur.	
			Proximal seed	Distal seed
Cholesterol*	5.8	3.7	7.7	6.9
$\Delta^7$ -Cholesten-3 $\beta$ -ol	2.8	0.8	1.3	1.2
Campesterol†	6.4	7.5	7.4	8.7
Stigmasterol	5.0	3.8	5.1	5.8
$\beta$ -Sitosterol‡	39.0	57.3	45.3	46.8
$\Delta^5$ -Avenasterol	21.2	19.2	26.0	23.0
$\Delta^7$ -Stigmasten-3 $\beta$ -ol	6.4	2.0	2.5	3.0
$\Delta^7$ -Avenasterol	13.5	5.7	4.7	4.6

\* Includes trace of 5 $\alpha$ -cholestan-3 $\beta$ -ol.

† Includes traces of 24-methyl-5 $\alpha$ -cholestan-3 $\beta$ -ol and 24-methylene-cholesterol.

‡ Includes traces of 24-ethyl-5 $\alpha$ -cholestan-3 $\beta$ -ol, 24-methyl- $\Delta^7$ -cholesten-3 $\beta$ -ol and 24-methylene- $\Delta^7$ -cholesten-3 $\beta$ -ol.

<sup>1</sup> D. R. IDLER, S. W. NICKSIC, D. R. JOHNSON, V. W. MELOCHE, H. A. SCHUETTE and C. A. BAUMANN, *J. Am. Chem. Soc.* **75**, 1712 (1953).

<sup>2</sup> B. A. KNIGHTS, *Phytochem.* **4**, 857 (1965).

<sup>3</sup> B. A. KNIGHTS and W. LAURIE, *Phytochem.* **6**, 404 (1967).

<sup>4</sup> S. M. THURSTON, *Ann. Appl. Biol.* **38**, 812 (1951).

results were obtained using GLC on OV-17 stationary phase, which resolved the fourteen-component mixture of *A. sativa*<sup>3</sup> into eight peaks as indicated. It may be seen that the biggest difference between the four fractions lies in the presence of appreciably less of the sterol  $\Delta^7$ -avenasterol ( $\Delta^{7,24(28)}$ -stigmastadien-3 $\beta$ -ol), together with rather more  $\beta$ -sitosterol in the wild oat species than in *A. sativa*.

Thus the sterol patterns of these wild and cultivated species of *Avena* show little difference suitable for taxonomic comparison. The similarity between "proximal" and "distal" seed of *A. ludoviciana*, seeds which exhibit a marked difference in dormancy,<sup>4</sup> discounts the possibility that sterols have any significant involvement in dormancy in these species

#### EXPERIMENTAL

Sterols were isolated by extraction and digitonin precipitation as described previously<sup>5,6</sup> and were analysed by GLC at 256° on 3 per cent OV-17. *Avena sativa* L. cv Star was obtained commercially. *A. fatua* L. was obtained from Hasler & Co. Ltd., Dunmow, Essex. *A. ludoviciana* Dur. was originally obtained from Rothamsted, Experimental Research Station and has been cultivated locally for some years.

<sup>5</sup> D. S. INGRAM, B. A. KNIGHTS, I. J. MCEVOY and P. MCKAY, *Phytochem.* **7**, 1241 (1968).

<sup>6</sup> W. BERGMANN, *J. Biol. Chem.* **132**, 471 (1940).