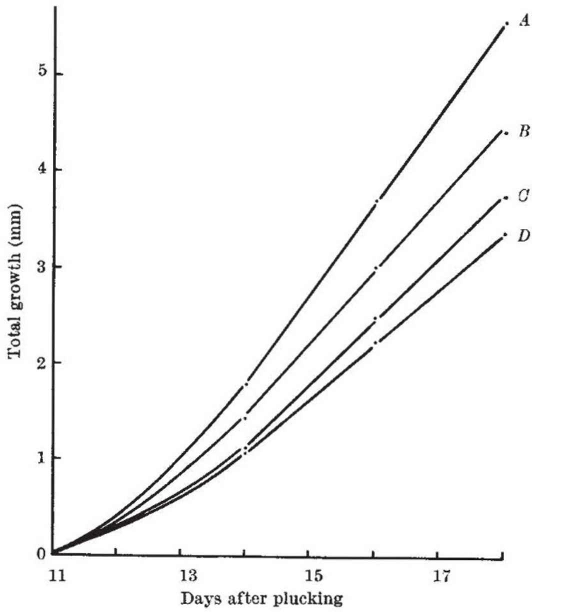

Fig. 3. Variation in growth rates of *A*, *B*, *C* and *D* type hairs from a single site

When examining the effects of various treatments on hair growth, it is convenient to make use of the period of approximately linear growth from the fifteenth to the twentieth days.

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Uptake of Nitrate in Winter by Two Ecotypes of *Festuca arundinacea* Schreb

North African ecotypes of *Festuca arundinacea* Schreb (tall fescue) have been found capable of considerable growth during winter in Britain[1]. In some circumstances, during this period they have shown yellowing of foliage not seen in indigenous material. The yellowing was confined to regrowth when cold weather followed autumn or winter defoliation and was sometimes followed by death of tillers. Grobbelaar[2] reported a reduced uptake of nitrate and other nutrients by maize when the root temperature was 15° C or less; Ayres and Doi[3] considered that, below a soil temperature of 62° F, absorption of nutrients by sugar cane was depressed.

The results presented here were obtained from an experiment (*H*305) in which swards of two varieties of tall fescue were compared, one derived from plants collected at an altitude of 5,000 ft. in Morocco, and the other *S*.170, a variety of British origin. Ammonium nitrate fertilizer was applied in August, October, November and January at the rate of 50 lb. nitrogen per acre at each date. The grass was cut and removed in September and again in late November. In February 1964, the foliage on the Moroccan ecotype was pale and yellowing, in contrast to the darker green of *S*.170. On March 6, the herbage was cut and the soil was sampled to 6 in. depth; soil was sampled again on March 12. The concentration of mineral nitrogen in the soil was determined (Table 1). There was about three times as much nitrate in the soil under the Moroccan ecotype as in that under *S*.170. Ammonium-levels did not exceed 5 p.p.m. and were similar under both ecotypes. Analysis of the cut herbage (Table 2) showed a high level of nitrogen in both ecotypes, but a slightly lower concentration in that from Morocco. A similar weight of dry herbage was removed from both ecotypes, but that on *S*.170 was of more recent growth.

Table 1. Nitrate Nitrogen in the Soil under Similarly Fertilized Swards of Two Ecotypes of *Festuca arundinacea*

Ecotypes	Sampling date (1964)	Replicates I	II	III	Mean
		NO_3—Nitrogen p.p.m. dry soil			
Morocco	March 6	11·5	14·0	13·7	13·1
	March 12	12·2	11·9	13·8	12·8
S.170	March 6	5·5	5·8	3·3	4·9
	March 12	4·3	4·2	4·2	4·2

Table 2. Nitrogen Concentration in the Dry Matter of Herbage Cut in March from Two Ecotypes of *Festuca arundinacea*

Ecotypes	Sampling date (1964)	Replicates I	II	III	Mean
		% Nitrogen			
Morocco	March 6	4·9	4·7	4·7	4·8
S. 170	March 6	5·3	5·2	5·4	5·3

These results suggest a reduced uptake of nitrogen by the Moroccan ecotype during late winter. The greater residue of nitrate under this ecotype could be due to an inherently lower capacity to absorb nitrate at low soil temperature. It could, however, be due to differences in winter damage to foliage and in seasonal pattern of root growth between the two ecotypes. Also, in view of the relatively high levels of nitrogen in the herbage, yellowing may be due to deficiencies in uptake of nutrients other than nitrogen.

It had been observed previously that, to obtain winter production from North African ecotypes, nitrogen had to be available from early autumn: there was little response to fertilizer, when application was delayed until October or later. Difference among grasses in their ability to take up nutrients at low temperatures requires further study in relation to growth in winter.

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Measurement of Water Potential of Leaves by Methods involving Immersion in Sucrose Solutions

Present research on plant–water relationships emphasizes the need to evaluate the water balance in the plant.

Various techniques have been developed to measure suction pressure (water potential) of plant tissue. One method already established involves the immersion of leaf tissue in sucrose solutions of various concentrations and the determination of the isotonic solution, hence the suction pressure of the leaf.

Shardakov[1], adapting the method for use in the field, used change in density to determine the isotonic solution and Maximov and Petinov[2] used change in refractive index.

The success of the method depends: (*a*) on having a range of concentrations which includes hypertonic and hypotonic solutions with respect to the suction pressure of the leaves; (*b*) on there being no active, or appreciably passive, uptake of sucrose by the leaf tissue.

Slatyer[3] has referred to the "appreciable errors due to infiltration of the solution into the intercellular spaces, and in the case of plasmolysis, intracellular spaces of the tissues". Weatherley[4] mentioned the anomalous behaviour of sucrose as a plasmolyticum and demonstrated that active uptake of sucrose by leaves might be appreciable