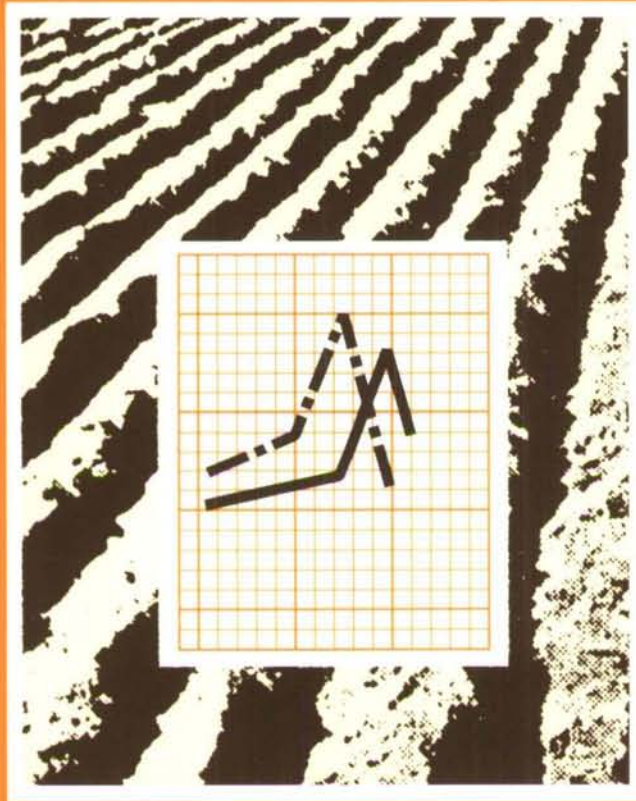


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# The Journal of Agricultural Science

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# The Journal of Agricultural Science

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**The Editors** must be informed if any of the material submitted has been published elsewhere. If a paper is accepted, it must not be published elsewhere in the same form. Experiments on animals must conform to the legislation in the country where the experiments were carried out. Work based on limited experimentation will not generally be considered acceptable. Work of local interest only is not considered appropriate for an international journal.

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**Layout and style.** Authors are advised to use the format adopted in recent issues. A simple direct style of writing is preferred. Spelling should conform to the *Concise Oxford Dictionary*.

**Title page.** The title should be informative but concise and should not contain abbreviations. It should name the organism studied, where relevant.

Authorities for Latin names should not be given in the title but may be given at first mention in the text. Authors should give full initials and surnames. The full name and address of the institution where the research was done should be stated. Change of address may be given as a footnote. A short title, not exceeding 50 characters, should be provided for the running headlines. Indicate at the foot of the page the name and address to which proofs should be sent.

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In Reference list:

- DABNEY, S. M., BREITENBECK, G. A., GRIFFIN, J. L. & HOFF, B. J. (1989). Subterranean clover cover crop used to increase rice yield. *Agronomy Journal* **81**, 483–487.
- FIRMAN, D. M. (1987). *Leaf growth and senescence of the potato*. PhD thesis, University of Cambridge.
- JONES, L. (1990). White clover understorey as a supply of nitrogen to cereals. In *Proceedings of the 13th General Meeting of the European Grassland Federation, Volume I* (Eds N. Gáborčík, V. Krajčovič & M. Zimkova), pp. 154–158. Banksá Bystrica, Czechoslovakia: Grassland Research Institute.
- KIRBY, E. J. M. & APPELYARD, M. (1984). Cereal development and its relation to crop management. In *Cereal Production* (Ed. E. J. Gallagher), pp. 161–173. London: Butterworths.
- SAXENA, M. C. & SINGH, K. B. (Eds) (1987). *The Chickpea*. Wallingford: CAB International.
- SMITH, A. B. (in press). Birds feeding in cereal fields. *Journal of Agricultural Science, Cambridge*.

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