Hong, T.D., Ellis, R.H., Astley, D., Pinnegar, A.E., Groot, S.P.C. and Kraak, H.L. (2005), *Seed Sci. & Technol.*, **33**, 449-460

Survival and vigour of ultra-dry seeds after ten years of hermetic storage

T.D. HONG[1], R.H. ELLIS[1]*, D. ASTLEY[2], A.E. PINNEGAR[2], S.P.C. GROOT[3] AND H.L. KRAAK[3]

[1]Department of Agriculture, The University of Reading, Earley Gate, P.O. Box 237, Reading RG6 6AR, UK (E-mail: r.h.ellis@reading.ac.uk)
[2]Genetic Resources Unit, Horticulture Research International, Wellesbourne, Warwick, CV35 9EF, UK
[3]Plant Research International, Droevendaalsesteeg 1, P.O. Box 16, 6700 AA Wageningen, The Netherlands

(Accepted June 2004)

Summary

Seeds of carrot, groundnut, lettuce, oilseed rape and onion were stored hermetically in laminated aluminium foil packets in four environments (dry or ultra-dry moisture contents combined factorially with temperatures of 20°C or -20°C), replicated at several sites. After ten years' hermetic storage, seed moisture content, equilibrium relative humidity, viability (assessed by ability to germinate normally in standard germination tests) and vigour were determined. After a decade, the change in seed moisture content of samples stored at -20°C was small or nil. Except for groundnut and lettuce (where loss in viability was about 8 and 3%, respectively), no loss in viability was detected after 10 years' hermetic storage at –20°C. In all cases, there was no difference in seed survival between moisture contents at this temperature ($P > 0.25$). Comparison of seed vigour (root length and rate of germination) also confirmed that drying to moisture contents in equilibrium with 10-12% r.h. had no detrimental effect to longevity when stored at -20°C: the only significant ($P < 0.05$) differences detected were slightly greater root lengths for ultra-dry storage of four of the six seed lots. Seed moisture content had increased after a decade at 20°C (generally to the level in equilibrium with ambient relative humidity). Hence, sub-zero temperature storage helped maintain the long-term integrity of the laminated aluminium foil packets, as well as that of the seeds within.