WEIGHT LOSS AND SPROUTING OF BULK-STORED MAINCROP POTATOES IN ENGLAND

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1. INTRODUCTION

Wastage in stored potatoes was regarded by Wilson and McKee (1948) as falling into two main categories - “pathological” and “natural”. “Pathological” wastage, defined as losses from disease and insect attack and from physiological breakdown caused by faulty storage conditions, could usually be avoided by applying known methods of control (Wilson and Boyd, 1945): “natural” wastage, defined as losses from respiration, loss of water, and sprouting, could not be so controlled, was not always readily apparent and was difficult to assess. It is the purpose of this paper to investigate “natural” wastage in both clamp and store.

Previous attempts to estimate “natural” wastage – or shrinkage, as it is commonly termed – in the British Isles have been few. Crook and Watson (1948), in a small scale experiment with sectional clamps, found that shrinkage of variety Majestic after storage from October to July amounted to 24.9% of the original weight stored when the soil cover was removed from the clamp in the spring and was only 12.4% when the winter coat of soil was retained. This difference was entirely because less water was lost: dry matter losses remained the same at rather more than 3% of the original weight stored. Drew and Deasy (1943), working in Eire, again with sectional clamps, at first failed to avoid rotting. In the second of two seasons work, however, the losses from rotting did not exceed 4% in any section of their three clamps; they give figures (percentages of original weight stored) for total losses, i.e. shrinkage + rotting, ranging from 4.6% for variety Up-to-date to 11.3% for variety Kerr's Pink after 6 months storage (final clearance in mid-June). Dry matter losses were found to range up to 2% over the period of the experiment.

The primary aim of the work now to be described was an extension of this type of investigation to clamps of normal commercial construction (i.e. non sectional) and to storage buildings; it was hoped to establish not only figures for net weight loss and total shrinkage in at least one typical maincrop variety, following the usual practices of commercial storage, but also the effect on sprouting and weight loss of the different methods of management of potatoes bulk-stored in permanent buildings.

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Twenty-one successful experiments were made, involving nine stores and twenty-four clamps in the counties of Hertfordshire, Leicestershire, Lincolnshire, Nottinghamshire, Shropshire, Staffordshire, and Warwickshire. The variety was King Edward in all except two experiments where it was Majestic and Dr. McIntosh respectively. The first experiments were in 1949 and the last in 1953.

2. EXPERIMENTAL METHOD

It was apparent that total weighings were not feasible if the work was to be conducted on more than a very small scale and was to include commercial clamps; the total weight method was also obviously impracticable for use in potato stores. For these reasons, all the experiments were made with open-mesh sample sacks. The sacks were embedded in commercial potato stores and clamps during loading or construction and were subsequently recovered for re-weighing when the stored potatoes were sold in the normal course of trade. All samples were weighed within a few hours of recovery. This same method was used in the Agricultural Research Council's experimental potato store at Sutton Bonington and in the (non-sectional) clamps built in association with it, although there, management and disposal of the crop were not subject to overriding commercial considerations.

2.1. Sample sack arrangement in clamp and store

All the clamps used were built in accordance with local practice: to reduce variation from clamp size, however, all were made on a 6 ft (1.83 m) base of potatoes, with height to ridge of 3 ft (0.91 m). Two sacks, one at each face, were used to sample the peripheral zones of the clamp and two others, one above the other, to sample the central zone (about 50% of the volume of a clamp on a 6 ft base is contained in an outer layer 12 in (30.5 cm) thick down each side: this arrangement is shown diagramatically in Fig. 1. At Sutton Bonington, where at least four separate clamps were constructed each year, the clamps contained only one such series: with three exceptions.

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![Diagram of sample sack arrangement in clamp](image)

Fig. 1
Sample sack arrangement used in clamps

ABB. 1
Anordnung der Probesäcke in Mieten

Fig. 1
Disposition des sacs d'échantillons dans les tranchées

1 See APPENDIX.