

YongLin Ren Y, Agarwal M, Newman J, Pan S, Li J, Xiao Y (2021) Delivery and adoption of nitrogen technology for the management of grain storage pests and grain quality. Page 160. In: Jayas DS, Jian F (eds) Proceedings of the 11<sup>th</sup> International Conference on Controlled Atmosphere and Fumigation in Stored Products (CAF2020), CAF Permanent Committee Secretariat, Winnipeg, Canada.

## **Delivery and adoption of nitrogen technology for the management of grain storage pests and grain quality**

YongLin Ren\*, Manjree Agarwal, James Newman, Shuting Pan, Junxi Li, Yu Xiao

College of Science, Health, Engineering and Education, Murdoch University,  
90 South Street, Murdoch, WA 6150, Australia.

\*Corresponding author's email: [y.ren@murdoch.edu.au](mailto:y.ren@murdoch.edu.au)

### **ABSTRACT**

To develop nitrogen technology as a complementary technology to the use of fumigants for control of key pests in Australian grain storages, market feedback from industry was that cost remained a barrier to uptake. The need for gas-tight storages was another barrier although this is reducing as insect resistance to the fumigant phosphine drives grain industry to uptake of sealed storages. However, recent advances in the cost of nitrogen generation (membrane technology) to assist industry overcome operational barriers to the uptake of the technology. A new generation membrane technology was sourced from Changshunanda, a large China-based company. The unit was deployed at the CBH grain port of Kwinana to compare performance against an older nitrogen generation technology (Pressure Swing Absorbance / PSA). To meet the strict operating conditions at the port the unit was upgraded by Changshunanda. A cost benchmark targeted at \$0.50 per tonne of grain (the high-end cost of a phosphine fumigation). The research demonstrated an operational cost for the older PSA technology of \$2.43 per tonne of grain. The technology also displayed operational limitations in its ability to generate and maintain the required level of nitrogen purity necessary to provide insect control (99%).

**Keywords:** Fumigant, Nitrogen, Fumigation, Grain, Stored Grain Insect, Grain Quality