

Future Prospects of X-Ray Radiography in the Detection of Hidden Insect Infestation

A Nagaraju, T. Ramesh Babu and B. Sarath Babu

Department of Entomology, Acharya NG Ranga Agricultural University,
Rajendranagar, Hyderabad - 500030, Andhra Pradesh, India

Abstract—X-ray radiography is a non-destructive method to detect the hidden infestation and highly useful to check the entry of pests of quarantine significance in imported seed material meant for crop improvement research programs. These studies have clearly demonstrated the usefulness of standardized X-ray radiography values in quarantine programs to prevent the entry of invasive alien pests which are not yet reported from India. The results have also conclusively proved that the X-ray radiography methodology doesn't leave any harmful effects on seed germination. Hence Real time X-ray imaging without having to use X-ray film and image processing in dark room, hold promise for future. Real time X-ray imaging is already in practice where high cost of equipment is not a burden for the user. In real time X-ray imaging along with the data generated instantly provide ample scope to make advanced interpretation viz., insect species, type and nature of infestation and the damage projection. Determination of the real-time system as a suitable replacement for film in the seed sampling process depends on several factors. If the grains to be processed within a short period of time, then the youngest insects present, which are not detected by the real-time system, would not be a factor in the quality and could be ignored. In this case, the lower number of false positives would suggest that the real-time system would be more appropriate. On the other hand, if the grain is intended for long-term storage and fruits meant for imports and exports, then the undetected infestations are extremely important, and film may be a better choice. There is also the factor of the initial cost of the X-ray system, as the real-time system is more expensive than a standard X-ray film cabinet. Over a period of time, the initial costs could be recovered through savings in film, developing, and manpower. Future applications will depend on the financial support granted to carry these studies. As the cost of equipment of the real time system comes down, the usage most certainly will be taken up by all concerned stakeholders in place of X-ray film imaging considering the huge advantages associated with this method. Therefore, this gap is to be considered as future line of work in this area of research.