

# Applications of GIS in modern orchard management systems

Matthias Backes<sup>1</sup> and Michael M. Blanke<sup>2</sup>

<sup>1</sup> Institute of Cartography and Geoinformation, University of Bonn,  
Meckenheimer Allee 172, D-53115, Bonn, Germany

backes@ikg.uni-bonn.de

WWW: <http://www.ikg.uni-bonn.de>

<sup>2</sup> Klein Altendorf Research Station, Department of Horticulture,  
Meckenheimer Str. 42, D-53359, Rheinbach, Germany

mmbanke@uni-bonn.de

**Abstract.** Modern orchard systems require elaborate management, because a variety of different farming factors or decisions and legislative restrictions have to be considered during the production process. Most of these factors have to be considered spatially and temporally precise. Since fruit trees in orchard systems grow as discrete objects in rows of different characteristics, they are predestined for analysis using GIS applications. For the orchard management there are several possible applications of GIS systems that could be used in order to increase the agricultural productivity and the efficiency of labour. First of all it is possible to integrate network analysis in larger orchard systems with the purpose of optimising fruit harvest. GIS could contribute to organise tractor trails between the narrow tree rows, distribution of boxes for picking the fruit and the transport of the boxes from the tree rows to the store facilities. Additionally, GIS is capable of supporting GPS-assisted targeted pesticide applications in cases of localised disease outbreaks, e.g. scab or mildew in apple, in a variety block or tree row due to spore transmission from a neighbouring orchard. With the introduction of new pesticide regulations on the use of drift-reducing nozzles, drift control can be facilitated by GIS e.g. from nearby water streams. Overall, GIS facilitates processing of metadata and documentation of fertiliser and pesticides as increasingly required by EUREP-GAP (Euro-retailer produce working group - Good Agricultural-Practices) and QS (Quality Control System) certification of fruit orchards which will substitute IFP (integrated fruit production) in due course. In this poster presentation the above mentioned possibilities will be demonstrated on the basis of a GIS customised for these purposes.