Faculty of Agricultural Sciences

"Digital Value Chains for a Sustainable Small-Scale Agriculture"

Exemplary on-farm research of region-, period- and sward-specific grassland yield prediction using geoprocessing methods

Stumpe C.[1], Mundt M.[2] and Böttinger S[1].

[1]Institute of Agricultural Engineering, University of Hohenheim, Garbenstr. 9, DE-70599 Stuttgart
[2]Esri Germany and Switzerland, Ringstr. 7, DE-85402 Kranzberg

Research questions

– How can grassland farmers be supported with an easily accessible yield prediction?
– How can prediction be adapted to the growing conditions of their grasslands?
– What is the best tool to implement a site-specific yield forecast based on RPM measurements?

Materials and methods

• four organic test farms in the Black Forest region
• species-rich and heterogeneous grasslands

• compressed sward height (CSH) measured by the Grasshopper® system for dry matter (DM) yield calculation
• categorization of the dataset based on
  • (1) sward type
    (*grass-rich, balanced, clover- and herb-rich*)
  • (2) growing period
    (*1st period, 2nd period, 3rd period*)
• 9 specific equations derived for Black Forest region
• ArcGIS ModelBuilder is used to apply specific prediction equation
• yield maps are created using Kriging interpolation

Results and discussion

• yield level differs greatly within a field
• areas with relatively high and relatively low yields coincide when considering different cuts
• geoprocessing is a useful tool to convert RPM measurements into yield prediction depending on specific growing conditions
• yield maps are created

Conclusion

• on-farm research is necessary to develop region-, period- and sward-specific prediction equations
• geoprocessing methods enable to apply specific equations to RPM measurements
• prediction accuracy is improved
• site-specific management can be implemented based on yield maps

Contact

Christoph Stumpe, M.Sc.
University of Hohenheim,
Institute of Agricultural Engineering
christoph.stumpe@uni-hohenheim.de

www.diwenkla.de
www.agrartechnik-440a.uni-hohenheim.de