MONITORING WINTER WHEAT FREEZE INJURY BASED ON MULTI-TEMPORAL DATA

HUIFANG WANG 1,2, XIAOHE GU 1*, JIHUA WANG 1,2, YINGYING DONG 1,2
1Institute of Agricultural Remote Sensing & Information Technology Application
Zhejiang University
Hangzhou, 310058, China

2Beijing Research Center for Information Technology in Agriculture
Beijing Academy of Agriculture and Forestry Sciences
Beijing, 100097, China

ABSTRACT—Winter wheat freeze injury is one of the most serious damages in northern China. Timely and accurately monitoring freeze injury can provide quantitative damage assessment and decision support for after-injury field management. Freeze injury stress is directly related to the deviation of winter wheat population. This paper aimed to monitor the spatial-temporal distribution as well as the severity of winter wheat freeze injury with multi-temporal data. The field investigations were conducted in the wintering and setting stages, corresponding with the acquisition moderate resolution data of TM data and HJ-1A data. A multiple linear regression (MLR) model proposed in this paper by analyzing the relationship between plants number per mu and varieties of vegetation indices having strong correlation with wheat growth vigor. The survival rate serving as an efficient indicator of freeze injury severity was applied to generate freeze injury distribution map. The results show that assessment of survival rate grade can be utilized to not only monitor the freeze injury area and distribution of winter wheat, but also provide a scientific basis for measuring after-injury field management.