

Development of monitoring method of coffee leaf rust (*Hemileia vastatrix*) using remote sensing

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The value of coffee is the second largest followed by oil in the world trade market, and coffee has been a major crop in a number of countries. However, since 2008, coffee rust fungus (*Hemileia vastatrix*) has expanded its infection in Latin America and become a major threat to the coffee industry. Coffee leaf rust infection spreads fast through the air. Early logging and burning infected trees are only effective countermeasures against the infection, as there is no effective pesticide or breed that satisfies both coffee leaf rust resistance and flavor. Research on the coffee leaf rust has been paid attention for a long time. However, many of the studies remained in developing coffee leaf rust resistance breeds or ecology of coffee leaf rust. Remote sensing by satellite can monitor the wide range of fields cheaper and faster. Researchers on monitoring coffee leaf rust using remote sensing technology have been carried out since 1970s. However, their accuracy have been unsatisfied, and therefore more precise researches using up-to-date satellite images are expected.

Purpose of this research is to develop effective discovering method of coffee leaf rust infected areas using remote sensing. First, NDVI (Normalized Difference Vegetation Index) around the Cuchumatanes Mountains, Republic of Guatemala, was computed using Landsat7 satellite images. Based on previous researches, fields with different damage stages were set as test sites. As a result, seasonal changes, i.e. dry and rainy season, of NDVI were observed in all test sites regardless of their damage stages. In addition, NDVI of test sites with damages tended to be lower than the sites without damages as time advances. NDVI obtained from no damage sites tended to show a constant value except for the seasonal changes regardless passage of time. These results support that NDVI is lowered by infection of coffee leaf rust. The monitoring method in this research could be applied to other crops and vegetation.

Keywords: Republic of Guatemala, coffee leaf rust, remote sensing, NDVI