

Detection of Armyworm Attack on Wheat Crop

Background:

Damage to wheat crops by pest populations varies from year to year. Economic and environmental damage is minimized by early detection and treatment of pest infestation. In an interesting use of satellite imagery, a farmer in the Red River Valley of Minnesota used Landsat imagery to confirm damage caused by armyworms in two varieties of wheat, Oxen and Lars. The farmer noticed the armyworm infestation to parts of his field during a routine investigation. As it was hard to pin point the areas of attack, he then sprayed pesticide for the whole field. After harvest the final yield map was compared with two Landsat scenes, one taken in June before the insect attack was noticed, and the other taken in late July, a few weeks after spraying.

Use of Data:

The abnormally low reflectance areas on the July image indicated areas of armyworm attack (fig 1). This was compared with the yield map (fig 2), and a remarkable correlation was found between these two areas of high armyworm attack and low yield. Without pest damage, the yield at harvest would have been higher in these two locations. The June imagery did not reveal the army-

worm infestations. This clearly indicated to the farmer that with imagery taken at the appropriate time, it is possible to spot infestations and attack the pest without waiting until harvest to discover low yielding areas. The July imagery also clearly showed the two different wheat varieties (fig. 1). While Oxen was more susceptible for the armyworm attack, Lars seemed to be more resistant to the pest. This prompted further investigation of Lars wheat properties by the farmer and he reasoned that Lars did not attract armyworm because of its higher lignin content.

Economic Benefits:

The July imagery helped in understanding the impact of armyworm attack on wheat. If the farmer had immediate access to an earlier imagery that showed the two spots of insect attack, the insecticide application could have been targeted precisely to where the problem existed, yielding both economic and environmental benefits.

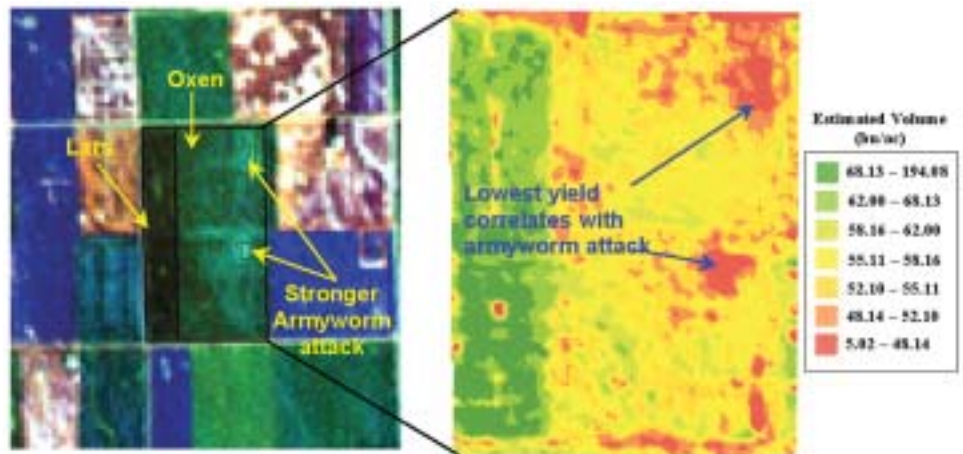


Fig 1. Landsat image showing insect infestation to wheat crop. The image also allows the differentiation of the two varieties.

Fig 2. Wheat yield map at harvest showing lower yield in the areas of armyworm attack.

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