Progress Report No. 9

Title: A Study of the Early Detection of Insect Infestations and Density/Distribution of Host Plants.

Citrus Insects Research
USDA, ARS
509 West Fourth St., Weslaco, Texas 78596

Period: October 1-31, 1973

EREP Investigation No. 319
NASA Contract No. 116301

Principal Investigator: William G. Hart
Sammy J. Ingle
M. R. Davis

NASA Technical Monitor: Clayton Forbes, Mail Code TP6
NASA-Manned Spacecraft Center
Experiment Development & Integration Br.
Houston, Texas 77058

(a) Aerial surveys using color infrared film have been conducted over the Mission and Delta Lake test sites and additional flight lines have been flown in our efforts to map the lower Rio Grande Valley citrus area. Cloudy weather continues to hamper our efforts to complete the studies of these test areas. Despite the unfavorable weather conditions we were able to complete 18 hours of flying during the month. The film has been processed, studied with photointerpretation techniques, labeled and stored for subsequent use in correlation with Skylab data. Ground truth data has also been collected over the test sites and in response to unusual factors recorded on the film. Our studies have been hampered by 2 problems to date, unfavorable weather conditions and a lack of S190B data. For our purposes the improved resolution with S190B would offer the possibility of more accurate identification of host plantings and detection of the distribution of damage caused by insect pests.

(b) Our studies require the maximum resolution available since we may be limited to relatively small plantings or portions of plantings for detection of factors we consider important. For this reason we urgently need S190B data with either color infrared film or black and white infrared film. These films have

proven most useful in detecting differences in vegetation that are pertinent to our investigation. While we have been hampered by unfavorable weather conditions, we have a backlog of aerial photography and ground truth data that needs to be correlated with Skylab data if we are to achieve maximum results in our investigation. This can only be accomplished with the most effective camera and film system available in the Skylab.

(c) Through the use of the multispectral viewer, which should be delivered in the near future, we expect a significant improvement in detection of variations of the reflectance characteristics of vegetation. Hopefully this will enable us to provide more detail on vegetative types and greater insight into avenues of entry of various pests. As the seasonal cycle progresses we should be able to separate permanent type cropping (i.e. citrus) from annual crops if adequate Skylab data is received.

(d) The most significant results from Skylab data has been the detection of patterns of vegetation on both sides of the Rio Grande River. This should assist in determining the areas that require greatest stress in surveillance studies for insect pest introductions on both sides of the border. This could be greatly improved with data from S190B with color IR or black and white IR film.

(e) Skylab 4 should provide us with the most informative data since there are few crops planted during the winter months that can be confused with citrus. If we receive data with maximum resolution, it should enable us to pinpoint significant detail about the citrus and provide regulatory and control personnel with the patterns of distribution of host plants of citrus pests on both sides of the border.

(f) Travel during this reporting period was confined to that required for ground surveys and in connection with aerial surveys.