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IDENTIFICATION OF LARGE MASSES OF CITRUS
FRUIT AND RICE FIELDS IN EASTERN SPAIN

(ERTS - 1 - P - 0463)

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ABSTRACT:

The project Valencia ERTS - 1 - F - 0463 falls upon the province - with the same name. It's a classical zone of intensive horticultural cultivation and extensive rice fields, the arboreous plantation of this area include the best spanish citric groves.

For that reason the main project of this program, besides others -- questions, is the detection of phytosanitary conditions of the citrics.

This project has an extensive background study, but not having received a periodical information of ERTS imagery, it has not been possible to make an accurate estimate, as we first pretended.

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The zone selected to develop the third project (ERTS A-F, 0463) is located in the Valencia region of East Spain. It is a classical zone of intensive horticultural cultivation and extensive rice fields, where the best Spanish citric groves are also found within the arboreous plantation of this area.

For this reason, in addition to the work aimed at possibly differentiating these crops, according to their spectral signature and variation in time, the main project of this program is to detect the phytosanitary conditions of the citrics to permit adequate or recommended preventive measures to be adopted in each case.

However, immense difficulties must evidently be encountered when trying to even remotely classify or differentiate the horticultural cultivation considering that the land is divided up into a large number of private plots particularly in this region. Added to this, there is a wide disparity of species grown with different vegetative developments, intercalating with uncultivated plots, whose density depends on the period of the agricultural year.

In our case and for prior information, firstly considering the restrictive factor of the resolutive power of the sensors used, we reduced aerial photographs of the zone to scales of approximately 1:100,000, 1:200,000 and 1:400,000 etc., similar to the ones taken from the ERTS negatives. As was expected, these images resembling a web or mosaic of dots in different shades and sizes corresponding to homogeneous masses or crops of the same specie, are much fainter and diluted compared to the ones corresponding to the aerial photograph reductions.

Certain broad zones can however be defined, as in the case of neglected rice fields, now replaced by horticultural crops

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found between Sagunto and Nules, in a strip parallel to the coast.

In addition, a zone of old rice fields, where pear-trees have now been planted could be identified and differentiated from the former ones, comparing the images on different wave lengths.

The widespread rice farming which is characteristic of the zone, grouped in low and humid land, is clearly differentiated from the rest, especially on bands MSS - 6 and MSS - 7, which as we know correspond to wave lengths 0.7 - 0.8 and 0.8 - 1.1 microns of the spectrum respectively.

On bands MSS - 4 and MSS - 5, a small lake known as "La Albufera" is camouflaged and even mistaken for a rice field. The reason for this is perhaps because it has a great density of surface alga, as this effect disappears on the bands mentioned first of all above.

Taking advantage of this clear definition which images MSS - 6 and MSS - 7 provide us of "La Albufera", densitometric studies are currently in progress to reach the most perfect definition possible of the rice zones, and to study the different depths of their waters, as an encouraging definition of same has been found in the images obtained with the isodensitometer, Photo Data Quantizer which has a graphic projection on video screen.

To make an early diagnosis of plant diseases, we are all aware of the different absorbent or reflectant power of leaves, according to the swelling of their cells, with regard to the impinging infrared radiations and the success achieved up until now on numerous occasions.

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In our case, we are trying to apply it to detect new sources, evolution and development of the infection and assessment of damage in plantations affected by a virus disease known commonly as "Quick Decline" due to the quick depression and death of the oranges affected, which is usually confused with other diseases that have a more or less similar symptomatology but where trees may recover.

In this case, as with the horticultural crops, it is necessary to consider the large way the property is divided up into plots, where different citrus varieties are grown, with their corresponding ample range regarding size and age in the plantations, degree of sensitivity, etc. All this, added to the variations of their vegetative development as a result of the fertilizer and kind of soil where they have been grown, provoke a camouflaging of the images which make it difficult for us to assess the phytosanitary state of the arboreal population.

On the other hand, out of the numerous plagues and diseases which affect the citrus, there are many (physiological diseases, attacks by fungus and threadworm in roots, etc.) which at a given moment produce depressions in the trees; these depressions interfere with the spectrum radiation reflectance in more or less a similar way for all, with the consequent difficulty in diagnosing the pathological producer cause.

From the above explanation and complementary work made up until now, comparing the data taken on land, with the aerial or land "false colour" photos, and other types of emulsion, we have drawn the conclusion that only with a regular periodicity in receiving information through satellites or aircrafts, shall we be able to make a closer evaluation of the phytosanitary state of the plantations, which we can use as index to assess damages and

forecast the products and average life.

Up until now, from the sole remittance of photos that have been received, we have ascertained the aforementioned difficulties as we have been unable to fit the land and aerial data we possess easily in these photos, because of lack of resolution and correspondence of shades.

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