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Patterned Vegetation Created by Ants and Observed in Satellite Images of Arizona

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Abstract

Large-scale patterns can arise in the vegetation of homogeneous areas due to biotic interactions of animals and plants. If the satellite imagery has a high enough resolution, such patterns can be easily observed. Here we show some large polka-dot arrangements, probably created by the red harvester ants, in Arizona, near the Grand Canyon.

Keywords: Patterned Vegetation, Ecosystems, Satellite images, Google Earth.
vegetation and other unwanted debris" [9].

Reference 9 is fundamental to understand the patterned vegetation that we can find in another area of Arizona. It is near the Vulcan's Throne, a cinder cone volcano and a prominent landmark on the North Rim of the Grand Canyon. This area is not reported in [9], probably because in 2008 the satellite images had a low resolution. Today, using Google Earth for the areas marked in the map shown in the Figure 1, we can see a large landscape covered by discs, that look like those shown in Ref.9. For this reason, we are here proposing that these discs are nest discs of ant colonies. The number of these discs, disseminated in a valley 10 km long is impressing.

Figure 1: The markers show a large area, 10 km long, near the Grand Canyon, where it is possible to observe a patterned vegetation, like that given in the following Figure 2.

Figure 2: Patterned vegetation having a "polka-dot" arrangement (Courtesy Google Earth, coordinates: 36°17'16.79'' N, 113° 05' 57.66'' W). A part of the image has contrast and brightness enhanced.

In the Figure 1, the markers are showing a large area, near the Grand Canyon rim, where, using Google Earth, we can see a patterned vegetation like that given in the Figure 2. The patterned vegetation has a "polka-dot" arrangement of discs. In the following Figure 3 and 4, the pattern is given in images with smaller scales.

Figure 3: Patterned vegetation having a "polka-dot" arrangement (Courtesy Google Earth, coordinates: 36°15'19.18'' N, 113° 04' 55.38'' W).
Of course, question could arise about the cause of such discs. If we compare the discs in the Figure 4, with a red harvester ant nest sketched in Ref.10, it seems that they are in fact the nests of these ants. However, since the dryland ecosystems can exhibit patterns of vegetation created by the competition between individual plants [11], a local investigation is required. However, in any case, due to the irregularity of the polka-dot pattern, I would like to exclude an unnatural origin.

References


[3] In Namibia, some grasslands that develop on deep sandy soils are punctuated by thousands of quasi-circular bare spots, usually surrounded by a ring of taller grass. As told in [2], the causes of these so-called "fairy circles" are unknown, although a number of hypotheses have been proposed.


