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A Short Note on Aeroecology

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DESCRIPTION

Aeroecology is the study of how airborne life forms use and interact with other biotic and abiotic elements of the environment. The aerosphere is seen as habitat, and how creatures respond to and exploit the changing aerospace has implications for the ecology, evolution, and conservation of numerous bird, bat, insect, and plant species around the world [1-4].Selection forces influence organisms' size and shape, as well as their behavioral, sensory, metabolic, and respiratory functions, in the aerosphere, the zone closest to the Earth's surface. In contrast to organisms that spend their entire lives on land or in water, changes in conditions such as winds, air density, oxygen concentrations, precipitation, air temperature, sunlight, polarized light, moonlight, and geomagnetic and gravitational forces affect organisms that use the aerosphere almost immediately[5]. Traditional ecological field research, such as direct observation or detection of organisms flying overhead, have been used in Aeroecology (e.g., moon watching, thermal cameras, or bioacoustics).The incorporation of remotely sensed data, particularly Doppler weather radar or nexrad, has advanced the disciplinesignificantly. The National Weather Center on the University of Oklahoma campus in Norman, hosted an international and interdisciplinary Radar Aeroecology Workshop in March 2012 [6]. Experts in ecology and meteorology explored how different radar technology could be used to address aero ecological issues. Aeroecology research groups at the University of Oklahoma and the University of Delaware are continuing to generate and integrate remotely sensed data to quantify, qualify, and track biotic use of the lower aerosphere [7]. Aeroecology has traditionally been defined asobservations of biological species occupying the airspace above taken from the ground. This may include feeding near the surface or utilizing human watchers with optics to watch passage migrants pass by the moon[8]. The capacity to detect and track sufficiently large creatures in the aerosphere was revolutionized with the introduction and applicationof technology such as thermo graphic cameras, marine radar, and nexrad to aero ecological studies .Dr. Sidney A. Gauthreaux pioneered aero ecological investigations employing weather radar during his doctoral studies at LouisianaState University and later as a professor at Clemson University. His early research using radar pictures from the WSR-57 network revealed a lot about Geotropically migratory bird arrivals and departures over the Gulf of Mexico. Radar beams will bounce off thick things like water droplets, airplane fuselages, and flying animals. The object's reflectance is determined by its radar cross-section, which is determined by the object's size, shape, and material composition. Weather radar reflectivity data is a generalization of the amount of rain or, for aero ecological reasons, the abundanceof animals in that volume of air, as it indicates the sum reflectivity of all objects within the sampled airspace [9].

The term“bioscatter” is used by aeroecologists to characterize radar reflection from living things. Doppler shift in returning waveforms can be detected by weather radars. This data is used to calculate the average relative velocity of all objectsin the measured airspace. This information has been used by aeroecologists to distinguish between objects drifting with the wind (particulates such as dust, seeds, or pollen), objects moving slightly faster/angular to the wind (e.g., insects), and objects moving at least 5–6 m/s faster than and/or moving against the predominant wind direction (e.g.,birds and bats)[10].

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