

Exploring the role of land cover on fowl cholera outbreaks in midwestern commercial poultry sites

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Fowl cholera is one of the most economically significant commercial poultry diseases, capable of causing 5-20 percent mortality in the early stages of the disease and a decrease in egg production. This study employs a case-control design utilizing an epidemiological approach to investigate the relationship between land cover and the odds of having fowl cholera outbreaks in midwestern poultry farms from 2014 to 2021. Five models were constructed using circular buffers around each farm with radii of 1, 2, 3, 4, and 5 km, respectively, to explore which land cover is critical in each radius. Preliminary results indicate that, within a 1 km radius, wetland is the only influential land cover, increasing the odds of a farm being a case by 4.28 times compared to farms without nearby wetlands ($P = 0.005$). Within 2 and 3 km radii, pasture/hay emerges as the most influential land cover type. For each 0.1 km² increase in pasture/hay coverage, the odds of being a case rise by 1.88 ($P=0.005$) and 1.27 ($P=0.005$), respectively. Within a 4 km radius, the presence of large forest areas (over 3 km²) increases the odds of an outbreak by 3.5 times compared to farms with smaller forest areas ($P=0.009$). In 5 km radius, for 1 km² increase in forest area, the odds of having an outbreak increase by 1.23 times. These findings can inform biosecurity decisions in the field, especially for farms located near the identified high-risk land cover types.

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