

Common Sense About Odor

by Robert Mikesell, Robert Meinen and Ken Kephart

An individual's interpretation of an odor is closely related to perceptions, feelings and memories. Odor from agricultural sources often is the cause of complaints. Some individuals may experience alterations in moods and others have reported nausea after exposure to odors from agricultural sources.

Odor sources may include livestock building, feedlot areas, manure storages and fields where manure or chemicals have been applied. From these sources plumes of odor move in the direction of the wind, dispersing up and down, but not much from side to side. Odor plumes will tend to rise from the ground during warm sunny days. Odor plumes can also stay close to the ground during times of temperature or thermal inversion when there is little wind and ground temperatures are lower than air temperatures. Application of manure during the morning hours can allow the manure to dry during the warming periods of the day when air currents lift odor up and away from neighbors.

A Penn State University study on three different odor reduction strategies on swine farms determined that biofiltration of confinement building exhaust could significantly reduce odor from swine facilities. Swine finisher minimum ventilation fans were exhausted through several inches of wood chips. Floating biofiltration and dust filtration techniques were also considered in this study.

This research surveyed neighbor and non-neighbors of large-scale agricultural entities to gain an understanding of how perceptions effect how an individual rates an odor. The direction from the farm in which the neighbor lived had an impact on odor scores. Neighbors to the East and South of these Pennsylvania farms rated odors as being worse than did their counterparts to the West and North. Farms that were rated as being more attractive were found to receive lower odor scores, as did farms where the neighbors personally knew the producer.

In this study respondents were asked to rate their overall health status. The scores of neighbors and non-neighbors were identical (4.1 on a scale of 1=not very healthy to 5=very healthy). But when asked about specific medical symptoms, neighbors indicated they experienced nausea, fatigue, and throat irritation more often ($P < .05$) than non-neighbors. There were no significant differences between the two groups regarding frequency of cough, headaches, muscular aches, chest tightness, depression or anxiety when demographic differences associated with gender, area of residence and history of farm residence were controlled.

The challenging aspect of these observations is that the health score and symptoms are self-rated and therefore may be subject to some bias, particularly if the neighbors regard the local swine operation as a source of conflict. To provide further analysis of the health symptoms, distance from the farm to health score and each health symptom was correlated. For health score and eight of the nine symptoms, there was no significant relationship ($P > .20$) between the frequency of symptom and the distance from the operation. One correlation (muscular aches) approached significance ($P < .075$), but the relationship was positive, which means people living closer tended to have fewer muscular aches. If the cause of the symptoms were the facility, then one would expect neighbors living close to the farm would have observed the symptoms more frequently than those living further away, but this was not the case.

To provide further insight into the health symptom observations, correlation coefficients between the neighbors reported desire not to live in this location, and the same health symptoms were calculated. In this analysis, the frequency of nausea, headache, muscular aches, chest tightness, fatigue, throat irritation, depression and anxiety were all positively correlated ($P < .01$) with the neighbors' desire to live somewhere else because of the swine facility. Similarly, health score was negatively correlated ($P < .05$). Therefore, it appears that the neighbors' health scores and reported frequency of health symptoms could be related to dissatisfaction with their location, rather than to distance from the swine operation.

References

Mikesell, R. E., K. B. Kephart, L. J. Ressler, and Willits, F.K. 2001. Comparison of Neighbor and Non-Neighbor Perceptions Of Large-Scale Animal Agriculture. An International Symposium on Animal Production and Environmental Issues. October 3-5, 2001, Research Triangle Park, NC.

Mikesell, R. E., K. B. Kephart, L. J. Ressler, and Willits, F.K. 2001. Field Testing of Odor Reduction Technologies on Swine Operations. American Farm Bureau Federation's 82nd convention and annual meeting, Jan. 7-10, 2001. Orlando, FL.

Teaching environmental stewardship to commercial manure haulers through a certification program. R. J. Meinen, K. B. Kephart, and L. J. Ressler. Penn State University, University Park, PA. American Society of Animal Science annual meeting. July 21-25, 2002, Quebec City, Canada.