HVLS fans seen as energy savers

By Scott Schultz
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LAFARGE — High volume, low speed "air foil" fans that have become popular in California dairy barns are starting to appear in Wisconsin dairy facilities.

Dave Kammel, a University of Wisconsin-Extension agricultural engineer, said there are questions to be answered about the fans' effectiveness and recommendations, with agricultural engineers studying them in facilities in which they have been installed.

"It is still early to know if these fans are equivalent to the current design recommendations for the high-speed fan systems," Mr. Kammel said in a recent news release. "It will be critical to determine spacing and mounting height specifications to ensure that the fans have an influence area sufficient to provide a desired design velocity and to determine the fewest fans necessary to provide the desired velocity."

The HVLS fans are large-diameter paddle fans that can range from 8 feet to 24 feet in diameter. They use a three-quarter horsepower motor, rotating at about 60 revolutions per minute.

Mr. Kammel said the fans operate on the same principles on which ceiling fans in living rooms and bedrooms operate — the foils or blades are horizontal and push air downward. When the vertical air column hits the floor, it moves horizontally and radially away from the center of the fan.

In the past, HVLS fans were marked for industrial applications to keep workers cool in large areas.

In recent years, however, the fans found their way into barns in California.

"They found energy savings to be one benefit of the system," Mr. Kammel said. "Fans are placed approximately 60 feet apart. One fan mounted in the middle of the barn over the feed driveway can potentially influence the entire barn width."

The fans cost $3,500 to $3,900 apiece, depending upon the diameter and the controls.

Bob Thelen, who installed HVLS fans in the two free-stall barns on his family's LaFarge-area farm, said they have worked in reducing electrical requirements for fan-driven ventilation in the barns. He installed six fans in a 108-by-320 foot barn and five in a 108-by-240 foot barn.

"They're sort of 'spendy,' but we won't use the same amount of energy that we would have with other fans," Mr. Thelen said.

The free-stall barns on Mr. Thelen's farm were built three years ago and, when he learned about their use in California, he investigated "out of necessity."

"The necessity was that, when we built the barns, we hadn't planned on needing so much more electrical service," he said. "If we wouldn't be using these, we would have had to put in another transformer to run the other fans."

The amperage required — Mr. Thelen said it's about a third of conventional barn fans — has allowed them to switch electrical hookups from water heating systems used in the winter to the fans in the summer.

"The air movement probably isn't that much different using these fans, but the energy costs are," Mr. Thelen said.

Measurements taken in Mr. Thelén's barns showed places where the air was moved at 5 mph. Mr. Thelen said it can "definitely" be felt when the fans are on and

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when they're off.

"When we're cleaning up the 'refusals' while we're feeding the cows, the cows stay right at the bunk-lines when the fans are running in the summer. Otherwise, they'd move back away to go and do things away from the bunk-lines," he said. "We feel like we've picked up on their intake because of the fans." The fans each use about 300 watts to operate. Some electric utilities are considering electric rebates for energy efficiency for producers who use the fans.

Mr. Kammel said Ederer Dairy Equipment at Plain is the only distributor of the fans that he knows of in this region.

Mr. Kammel added that producers with questions about the fans may contact him at (608) 262-9776 or by e-mail at dwkammel@facstaff.wisc.edu.

"Since this is such a new system, I would also recommend getting in contact with a farm that has installed the fans to learn about their experiences," Mr. Kammel said.