Hearing Conservation for the Agricultural Community

K·STATE Research and Extension

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Ear muffs are one kind of effective hearing protection for agricultural workers.

The hazards of noise exposure

Noise injury in the agricultural community is a significant, yet preventable, problem. Children and adult farm workers are frequently exposed to loud equipment either in the field or inside a workshop. These hazardous noise levels can lead to hearing loss, which can in turn affect a person's social life and lead to isolation from peers and family.

Though significant hearing loss tends to be identified mostly in older farm workers, it has been shown that workers as young as 15 show slight hearing losses[1]. Noise-induced hearing loss cannot be corrected. Once damage occurs, the ear will never recover to its former ability, making it imperative that agricultural workers be proactive in preventing noise injury. It is important to become informed about noise-induced hearing loss, use hearing protection consistently, and teach other workers, especially youth, about the importance of hearing protection.

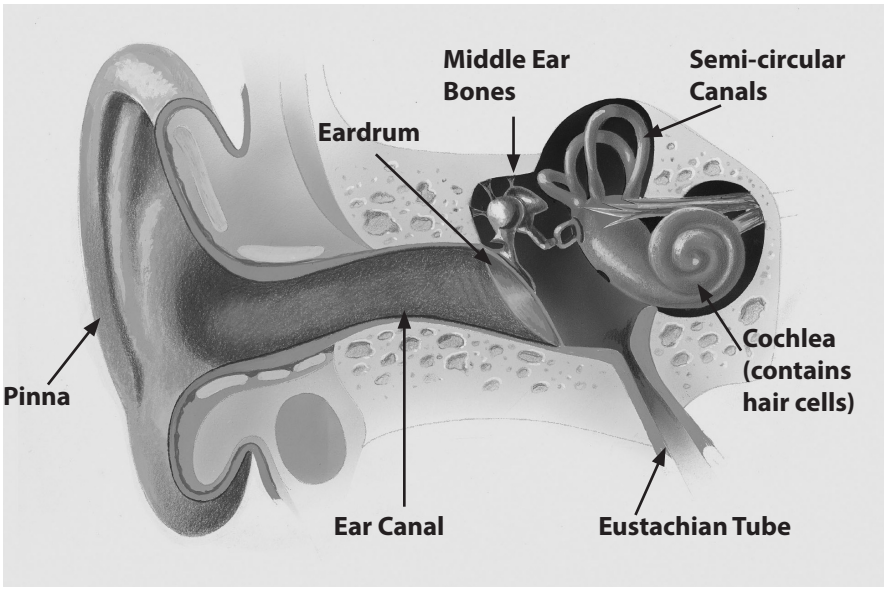
How do humans hear sound?

When sound reaches the ear, it travels through the pinna and into the ear canal. When the sound reaches the eardrum, the eardrum starts to vibrate. The vibrating eardrum causes the middle ear bones to vibrate, which in turn, creates waves in the fluid-filled cochlea. These waves bend over tiny hair cells, which send signals to the brain.

Photo by Edwin Remsberg, USDA

Agricultural workers should use hearing protection while operating farm equipment or working near loud machinery.

Diagram of the ear[2]



Ear diagram courtesy of Widex

What is noise-induced hearing loss?

Noise-induced hearing loss occurs when the ear is exposed to high-intensity noises for too long. The hair cells in the inner ear become damaged when excessively loud noises cause powerful waves to thrash against them for even short time periods. Noise-induced hearing loss tends to affect high frequencies, making it difficult to distinguish the sounds of letters such as *t, f, p, s, ch,* and *sh.*

How can noise-induced hearing loss be prevented?

Be conscious about noise levels throughout the day. Farm managers need to ensure that all farm workers and children have access to hearing protection. Hearing protection devices should be stored in all equipment, shops, or other places where loud noises are common.

Farm noise levels and exposure times

The greater a sound's intensity, the shorter the time before damage can occur. In fact, researchers found that with every 5-decibel increase in a sound's intensity, exposure time must be cut in half to ensure that no damage occurs. For example, a person can listen to a 90-decibel sound for 8 hours, but can listen to a 95-decibel sound for only 4 hours without danger of hearing loss.

Table 1 (facing page), adapted from observations by researchers[3], shows the highest sound intensity level of common farm equipment. The table also shows the recommended exposure times for operators and bystanders. Note that this table takes into consideration normal operating conditions. Results might vary depending on size, age, and location of equipment.

Types of hearing protection

Hearing protection is needed whenever a person's voice must be raised to be heard an arm's-length away. The two main types of hearing protection are ear plugs and ear muffs.

Ear plugs are inexpensive and disposable. Earmuffs can easily be tied onto cabless tractors and off-road vehicles. Assess each situation where hearing protection is needed and decide which type works best for that location. In addition, custom-made ear protection can be obtained from an audiologist.

Do you have a possible hearing loss?

Y N Do people seem to mumble?

Y N Do you always need to turn up the television volume?

Y N Do you have ringing in your ears?

Y N Do you have trouble hearing a conversation when there is background noise?

Y N Do friends and family say that you have trouble hearing?

If you answered yes to at least two of these questions, contact an audiologist and request a hearing test.

Do you believe these popular myths?

Myth: Hearing loss is a normal part of aging.

Truth: Just like all other senses, a slight decrease in the sharpness of a person's hearing is a normal part of aging. However, excessive loss is not. Hearing loss caused by noise can be slowed with the use of hearing protection.

Myth: I don't need a hearing screening until my hearing gets so bad that I think I need amplification.

Truth: Regular hearing screenings monitor any amount of loss. Monitoring loss helps determine how to better implement conservation strategies.

Myth: I cannot wear earplugs or earmuffs because they are too uncomfortable.

Truth: Users get used to the feel of hearing protection as they would a new pair of shoes or glasses.

Myth: I cannot hear my machinery when I wear hearing protection.

Truth: Hearing protection does not block all noise, and changes in the sound of machinery can still be heard safely. Hearing protection does not need to block out 100 percent of the noise to be successful.

Myth: I have never worn hearing protection, and I can still hear as well as I could many years ago.

Truth: Hearing loss is gradual and may not be noticed until there is a significant loss.

Table 1. Noise levels and exposure (h = hour, m = minute)

Machinery and worker position during normal operating conditions	Noise level at ear in decibels	Recommended exposure durations without hearing protection [a, b, c]
Air compressor	95	4 h
All-terrain vehicle	87	12 h
Angle grinder	100	2 h
Bystander in workshop	93	5 h, 15 m
Auger	96	3 h, 30 m
Bench grinder	104	1 h
Bystander in workshop	96	3 h, 30 m
Bulldozer	100	2 h
Chain saw	107	45 m
Bystander stacking wood	99	2 h, 15 m
Circular saw	101	1 h, 30 m
Bystander in workshop	94	4 h, 30 m
Cotton module press	88	10 h, 30 m
Bystander in field (rakers)	86	13 h, 45 m
Cotton picker	85	16 h
Increase with radio on	3	10 h, 30 m
Bystander – field (machine idle)	89	9 h
Bystander – field (picker turning)	94	4 h, 30 m
Dairy parlor – herringbone (24 stall) pit	75	16+ h
Farm truck	88	10 h, 30 m
Firearm	140+	No exposure is safe
Forklift	88	10 h, 30 m
Combine	91	7 h
Increase with radio on	5	3 h, 30 m
Bystander in field	90	8 h
Irrigation pump	104	1 h
Motorbike – 2 wheel	92	6 h
Packing shed workers	82	16+ h
Pig handling – suckers	109	34 m
Pig shed – manual feeding	99	2 h, 15 m
Sheep shears	87	12 h
Bystander in shed	83	16+ h
Sugarcane harvester	86	13 h, 45 m
Increase with radio on	2	10 h, 30 m
Tractor with cab	78	16+ h
Tractors with cabs 10+ years old	84	16+ h
Increase with radio on	5	9 h
Bystander in field	90	8 h
Tractor without cab	93	5 h, 15 m
Bystander in field	86	13 h, 45 m

[a] The percent of time spent exposed to each activity is cumulative toward the total noise exposure risk. For example, if listeners stay near a noisy activity for half the recommended daily limit, they must be careful to cut in half the listening time for a second high intensity noise level activity for the day.

[b] Based on the Occupational Safety and Health Administration standards at *www.osha.gov*.

[c] Most exposure durations have been rounded down to the nearest quarter hour.

Find a local audiologist and more information about the ear

To find an audiologist, call the American Speech-Language-Hearing Association, 1-800-638-8255, or visit their Web site, *www.asha.org,* for more information.

References

1. Franklin, R. C., Challinor, K., Depczyski, J., & Fragar, L.J. (2002). *Noise exposure, hearing protection and noise injury in young adult farmers.* ACAHS & RIRDC: Moree, Australia.
2. Diagram courtesy of *www.widex.com*
3. Some parts of the table were adapted from: Franklin, R. C., Depczynski, J., Challinor, K., Williams, W., & Fragar, L. J. (2006). "Factors affecting farm noise during common agricultural activities." *Journal of Agricultural Safety and Health* 12(2), 117-125.

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