

## Sarcoptic mange in swine

Gary A. Averbeck, MS and Bert E. Stromberg, PhD

**T**he sarcoptic mange, scabies, or itch mite of swine, *Sarcoptes scabiei* var. *suis*, is the cause of considerable discomfort to swine and is responsible for significant economic loss to producers. Proper diagnosis is the first step in dealing effectively with this parasite and bringing the herd back to health.

Many of the clinical symptoms caused by *Sarcoptes* are easily recognized. Increased scratching, dirty ears, and hyperkeratosis may indicate the presence of mites. However, a definitive diagnosis requires finding and identifying the mite. Infestations cause lesions that may vary in appearance from almost imperceptible skin involvement to very obvious crusts. Swine with noncrusted lesions have the highest density of mites on the face while pigs with crusted lesions have the highest density of *Sarcoptes* in the ear.<sup>1</sup> It is from these areas that appropriate specimens are best gathered and examined for mites.

Diagnosis should be made on a herd basis, not on individual animals. The entire herd should be inspected for symptoms. Start with the oldest animals and work your way down in age. Swine with crusted ear lesions should be sampled first. Scrapings should be taken from the ears and faces of suspect hogs.

Diagnostic techniques vary with the severity of the lesions. The technique of choice for smaller lesions is the simple skin scraping. The adult female *Sarcoptes*, the most common stage found infesting the host, tunnels at the edge of the lesions within the host's stratum corneum. The most effective sampling incorporates a deep scraping at the periphery of the lesion. Scrape an area of at least 1 sq in to ensure an adequate sample size. The scraping is made by pinching a fold of infested skin and taking a clean scalpel or razor blade dipped in mineral oil. While holding the blade at a right angle to the lesion, scrape the skin in the same direction until blood appears from the sampling site. Mites along with other debris will collect in the oil and adhere to the blade.

Transfer these 'scrapings' to a drop of oil on a microscope slide, cover with a cover glass, and examine microscopically. Low power ( $\times 10$  objective) magnification is adequate to observe mites, however higher magnification may help to con-

firm the identification. The mites are often alive and their movements make them easily identifiable.

After the mites die they will persist indefinitely in the oil preparation due to their resistant chitinous exoskeleton. Examine the slide(s) thoroughly because there are usually few mites harvested. Prepare the skin scraping slide to be mailed to a diagnostic facility by painting a ring on the cover slip with nail polish. It should be labeled with the client's name, clinician, host species, and host identification number.

Larger crusted lesions often are too bulky to be examined by simple skin scraping and a more aggressive sampling procedure may be used. Mites are found on the moist underside of the crusts and may be collected by first flooding the surface to be sampled with mineral oil or glycerine, then prying off or abrading the crust so that the mites can be collected. A variety of tools can be used for this purpose, including sharpened spoons and melon ballers, wood chisels, bone curettes, etc. Again a minimum of 1 sq in should be sampled.

Crusts may be placed in an appropriate container such as a clean petri dish, vial, or whirl-pack bag, and then labeled and sealed for transport. These specimens may be mailed directly to the diagnostic laboratory or taken back to the clinical laboratory for examination.

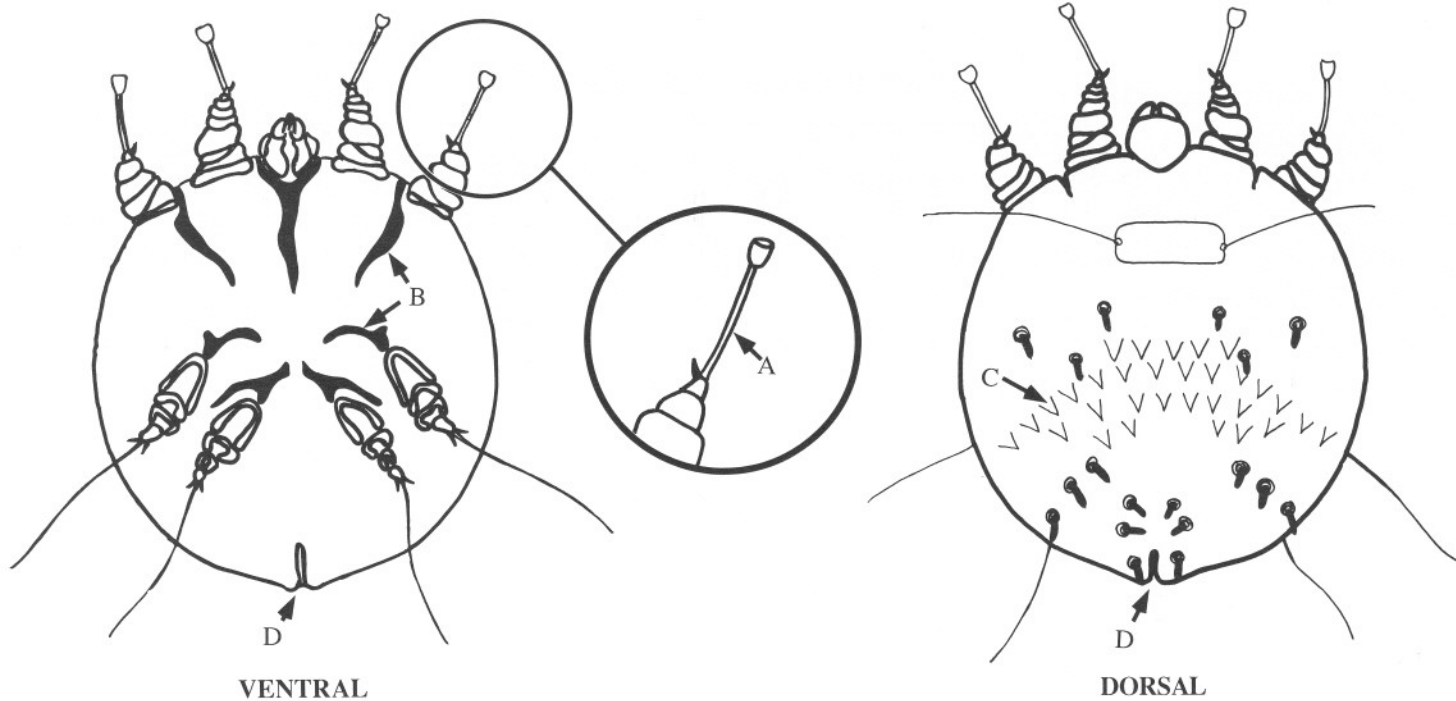
The crusts may be initially examined with a stereomicroscope or hand lens. The mites are a translucent white and should be viewed against a dark background with transmitted light. Often mite movements can be seen at low magnification ( $\times 10$ ). If mites are observed, they may be moved to a microscope slide with a probe or dissecting needle. The mites can be transferred to a drop of oil on a microscope slide, covered with a cover glass, and examined microscopically.

If no mites are observed, the crusts may be digested in 10% potassium hydroxide (10 volumes of 10% KOH to 1 volume crust) in a covered glass beaker. The digestion process will break down most components of the crust leaving mite exoskeletons unharmed. This slurry should be allowed to digest at room temperature for 24 hours or until the crusts have dissolved. The process can be accomplished in less time by boiling this solution (very cautiously) for 5 minutes. The liquefied crusts can be pipetted through a plastic filter with a pore size of 160  $\mu\text{m}$ . The filtrate can be examined microscopically.<sup>1</sup>

Alternatively, transfer the digested material to a centrifuge tube and centrifuge (5 minutes at 2000 rpm). Discard the su-

Department of Veterinary Pathobiology, College of Veterinary Medicine, University of Minnesota, St. Paul, Minnesota 55108

**Diagnostic notes are not peer-reviewed**



**Fig 1.**—Ventral and dorsal view of an adult female *Sarcoptes scabiei*. Structure (A) is an unjointed, sucker-tipped stalk or empodium. Structures (B) are apodemes which are dark-colored plates associated with the base of the legs. Structures (C) are V-shaped spines. Structure (D) is the anus.

pernatant and fill the tube with water, recentrifuge, and again discard supernatant. At this point the sediment may be pipetted to a microscope slide and examined directly for the presence of mites, or the sediment may be mixed with a flotation media such as a saturated sugar solution (or any solutions normally used to float parasite eggs from feces) and recentrifuged. The exoskeletons of the mites will float to the surface of the solution and can be easily collected from the surface and examined under a compound microscope, where you can observe the morphological features and make a definitive diagnosis.

*Sarcoptes* are very small white mites. The males range in size from 213–285  $\mu\text{m}$  long by 162–240  $\mu\text{m}$  wide and the female range from 300–504  $\mu\text{m}$  long to 230–420  $\mu\text{m}$  wide.<sup>2</sup> *Sarcoptes*, as shown in Fig 1, are round to ovoid when viewed from the back; when viewed from the side they are ventrally flattened and dorsally rounded (similar to a turtle). They possess short stumpy legs, and have no internal or external respiration apparatus (stigmata or tracheae). The ventral surface contains a number of chitinized plates called apodemes, the dorsal surface is partially covered by wide-angled, V-shaped spines

(Fig 1), the cuticular surface is sculptured into numerous parallel ridges which superficially resemble human finger prints (not shown), and the anus is at the posterior end of the mite. The morphology of the developmental stages of *Sarcoptes* varies. You can, however, differentiate the adult stages from other mite species using easily recognized characteristics. The last segment (tarsus) of legs I, II, and III on males and legs I and II on females have a long, unjointed empodium or stalk with a small sucker-like pad at its end (Fig 1). These stalks are diagnostic for *Sarcoptes*.

## References

1. Davis DP, and Moon R. Density, location, and sampling of *Sarcoptes scabiei* (Acari: Sarcoptidae) on experimentally infested pigs. *J. Med. Entomol.* 1990; 27:391-398.
2. Arlin LG. Biology, host relations, and epidemiology of *Sarcoptes scabiei*. *Ann. Rev. Entomol.* 1989; 34:139-161.

