Sacred Dead Cows, Not in My Rabbit Barn

Mark A. Grobner
Biological Sciences
California State University, Stanislaus
Turlock, CA
PRMA Journal. 4(1):6-7

As a follow up to Dr. McNitt's article, which showed how science works to examine and refine what is known, I would like to discuss science and how it applies to what we know about rabbits and their raising. While many think of science as very rigid and unyielding, it is in fact dynamic; changing as new information is accumulated. How do we apply science to rabbit raising and how do we determine if a practice is valid?

Rabbit raising is as much an art as a science, no one way is the "right" way in that what works great in one barn under a certain set of circumstances may not work in other situations. Production parameters from a herd raised in a climate controlled building will not match those from a facility using natural ventilation and lighting. It should be common sense to not expect the same production from both facilities as each has their appropriate place in rabbit production.

With that said, I have heard scientists and their results criticized for not conforming to expectations of rabbit growers. Some have gone so far as to hold scientists suspect. This is not just true of rabbit growers, but of the general population's perceptions of science. This should be expected from people who generally score low on surveys about science. In a recent survey by the National Science Board (2000), only 50% of the people asked knew the Earth goes round the sun once a year and less than 30% understood the term DNA. Unfortunately, these same individuals are being asked to evaluate other areas of science such as cloning and stem cell research.

What is science then and how does this apply to what we know about rabbit raising. Science is a body of knowledge covering general truths as obtained and tested through the scientific method. It is not one individual's observation that a California doe ate her litter, therefore all California does are bad mothers. The general truths are based on repeated observations of a result. These general truths may change based on new information, as Dr. McNitt showed with nursing behavior in does. New information was compiled and the truths evaluated using the new information.

One important point about the above definition of science is that the general truths are obtained and tested through the scientific method. Science is defined by its methods, not its subject matter. One thing to keep in mind is that science is a human endeavor and as such is fallible. One thing I like to tell my university students is that nothing is ever proven by science, but the odds that an observation is correct can be verified to the point beyond reasonable doubt. That is, if you have 95% odds of something being true, it is worth considering it so.

Before we get to the scientific method, lets look at another example of what can be considered anecdotal evidence that makes its way into rabbit production. Several years ago while waiting for a route runner to pick up rabbits I overheard two growers talking about breeding problems. The grower giving advice told the story of a doe he had that also wouldn't breed. He had heard that giving cider vinegar in the drinking water would increase the receptivity of does. He took this one doe, put her on vinegar for a month. At the end of the month the doe bred, so he put his entire herd on cider vinegar. Furthermore, he suggested the other grower do the same.

Looking at the above example, there are many flaws in the logic that vinegar had anything to do with the doe breeding. Not knowing the condition of the doe when the vinegar was first given, it may have been that the doe was either thin or fat. The time of year may have been a factor. The vitamin status of the doe, protein level in the diet and the possibility the doe had some type of infection preventing breeding could also be a factor. Attributing the sudden (after 30 days waiting) breeding to the vinegar is highly suspect, even though it may have been a contributing factor.

How could we know if the vinegar was the cause of the doe breeding? This is where the scientific method proves useful. It is an objective way of examining a problem to provide verification that a cause is tied to an effect (the vinegar administered resulting in the doe breeding). The scientific method is a series of steps that are used when looking for a cause and effect relationship. The steps, as outlined below, are followed to ensure that the conclusions drawn are valid. The steps are:

- General observation
- Hypothesis formation
- Experimentation
- Conclusion
- Verification

Using the vinegar example above, I want to go through these steps, pointing out what could have been done to show whether the vinegar had a role in the doe's ability to breed.

The first step is to make a general observation, which in this case is the doe not breeding. The problem then is to determine why the doe won't breed or what the doe needs to get it to breed. This is usually followed by extensive research into what others have reported in regards to the observation. From this information, a hypothesis is formulated. The hypothesis is a tentative explanation for the observation. Usually, several hypotheses are formulated and the more likely one is examined first. For instance, we could say the doe did not breed because it was too fat. Alternatively, we could say the doe did not breed because she needed vinegar. Not sure why the vinegar would be necessary myself, but for the sake of the example, we will use it as one of the hypotheses. I am sure with a little time, a long list of reasons for does not breeding could be drawn up and each could be formulated into a separate hypothesis.

A note about the hypothesis; a good hypothesis is generally a statement that can be answered with yes or no and they absolutely must be statements that can be tested. We can give vinegar to rabbits to test its effect, so this is a valid hypothesis. We cannot test the supernatural, so those effects generally lie outside the realm of science. Also, you cannot ever "prove" a hypothesis true (at least not 100% of the time) so we use a consensus of affirmations as a positive sign our hypothesis is true. This is due to the fact that we can't test "all" situations (or every rabbit in the world) and the variability between individual living organisms.

Once a hypothesis to be examined has been chosen, an experiment is designed. This is one area the vinegar anecdote completely missed. A good experimental design controls the variables that might affect the outcome: in this case the breeding ability of the doe. The only variable that should vary is the one variable being examined. As seen above, there are lots of reasons that the doe wouldn't breed or she suddenly bred. Without controlling them, this is done by having an experimental group and a control group, we cannot tell if these other factors or the vinegar had the affect. The control group of

animals (in this case breeding does) is handled, fed and otherwise treated identically to the experimental group (does being given vinegar) except they would not be given vinegar. In this way, if there is a difference between the breeding ability of the does in the two groups, it is highly likely that it is related to the vinegar. Without adequate controls, results are meaningless. I have also heard of people claiming that some change in management or feed had an effect on their herd. However, the effect cannot be validated when they are comparing one year's production to the next. Again, lots of things can be different from one year to the next; the weather could be milder or more sever, the grower has more years experience, the herd has gone through a year of selection, the source of alfalfa going into the feed may have changed significantly.

Another note about experimental design is to have adequate replicates (multiple animals) in a given group. When it comes to living organisms, there is a great deal of variability between animals. One animal is not a good sample of an entire herd. Multiple animals must be tested to avoid making conclusions on an animal that reacts differently is the exception rather than the rule. For instance, I am allergic to penicillin. Now, if Dr. Fleming (the discoverer of penicillin) first tried penicillin only on me, I would have died of anaphylactic shock, he would go to prison for murder and antibiotics would not be available today. In more than 95% of the population, there are no adverse effects to penicillin, so it has proved to be a beneficial drug. The same could be said for vinegar, only it may be this one animal responded favorably while the rest of the animals would show no response.

From our experiment we will collect data, observations based on our design. In the above example, we would collect data on the ability of the does to breed on the two treatments. These would then be compared using statistical analysis to see if any differences that existed between the control and experimental groups are due to the variation in the population or due to the treatment (vinegar). As mentioned above, there is inherent in any herd, variation in all traits. Not every rabbit is five pounds at eight weeks or kindles litters of ten. There are some that take longer than eight weeks to get to weight or that throw litters of five. Statistics is an attempt to control for this variation to be sure that differences in the control and treatment group are not just a random chance resulting from this inherent variation.

At times the conclusion will not support the hypothesis. This is why it is good to have multiple hypotheses available to test. If vinegar does not improve the treated group breeding record, one of the other hypotheses could be tested. Even if the hypothesis is supported by the data, say the vinegar rabbits had a higher number of does breeding; there is more that needs to be done.

Verification is the final step of the scientific method. To verify the results, the experiment needs to be repeated not only within the original herd, but more importantly, in other herds. To say that vinegar worked in one herd is not sufficient to support its widespread use. Multiple herds need to be tested.

The next time someone makes a claim regarding rabbit production, I would look closely at how they came to their conclusion. While keeping an open mind, a bit of healthy skepticism can aid growers in weeding through what might be of benefit and what may not. If there is no control group to compare results, the data should be carefully scrutinized. One other anecdote I hear is the use of the phases of the moon or zodiac signs to breed rabbits. I know a number of growers swear by this practice, however, until they take a group of rabbits and randomly breed them and compare them to rabbits bred by the moon phases or zodiac, the validity of such breeding is suspect at best. This is not to say it doesn't work, I am just one of those from Missouri and need to be shown. Not really, but we in California are born skeptics.