JUNE
By Ken Solomon

"Alfalfa Mowing"

Unfortunately, alfalfa reaches peak nutritional value just prior to most hens hatching their nests. Since alfalfa is the first, lush, green growth each spring, and since other nesting habitat is generally lacking, hens will concentrate their nests in alfalfa fields. Up to 70% of the nests will be destroyed and 50% of the hens destroyed by the swather. The nests not destroyed are heavily predated. Farmers hate the loss. Farmers will find and mow around nests, but the predators have learned that such islands have food in them. Placing a flushing bar in front of the equipment to scare the hen from the nest does not work. The closer the hen is to hatching her young, the harder it is to make her leave the nest. Short of an actual kick in the rear, she will not move, and you have scrambled hen.

Planting later maturing varieties of alfalfa, or waiting 5 to 7 more days before mowing, would allow most hens to hatch the nests and move the chicks. When seeing a hen running a short distance in front of the equipment, slow down, mow around the brood, come back to the island when the field is complete, and mow slowly with the blades 6 inches high.

"Incubate Eggs"

Should landowners try incubating the eggs they find while harvesting fields? If harvesting killed the hen, then try incubating the eggs. If the hen survived, the eggs are better left in the nest. True, once the protective cover is harvested, predators have a good chance of finding the hen and the nest. But it is better to chance predation and maybe allow the hen to raise her family, than to create an incubator/brooder mother. Without a hen to teach survival techniques and feeding habits, and to reinforce instinctive behavior patterns, the chicks' chances of surviving the wild are small. Of 50 chicks released in July or August, less than 15 will survive into winter, less than 4 into spring. Of 50 chicks raised by wild hens, 33 will survive into winter, and 22 into spring.

Trying to better these odds, Sweden placed incubator-hatched chicks with foster pheasant mothers. Chicks normally stay with the hens for 10 to 12 weeks. So at 10 weeks of age, the incubator chicks were released. Of 50 non-fostered chicks, 21 lived to three months. Of 50 fostered, 22 were alive. Little difference! Unfortunately the foster mothers were also incubator hatched.

"Insects and Body Temperature"

Peak pheasant hatch occurs the first two weeks of June, and the new chicks need insects. Up to two weeks old, they will grow faster than at any other time in their life, 8% weight gain per day. To support such growth, their diet must be over 90% insects. A minimum protein intake of 27% is needed both for growth and regulation of body temperature. The hen must brood her chicks during cool nights until they are 11-days old and can control

their own body temperature. An outdoor temperature of 43^0F for 30 minutes can kill 100% of the 2-day old chicks, 14% of the 7-day old chicks, and 0% of the 11-day chicks.

Spraying for insects during this time can slow the chick's growth, and can make them more susceptible to cool temperatures. If the chick's protein intake were to drop from the needed 27% to say 22%, it would take the chick 5 additional days to gain control of its body temperature.

"Insecticides"

With high insect infestations, landowners must spray to insure a crop. Concerned, they ask, "Of all insecticides, which one will have the least effect on pheasants?" The answer is unknown. Insecticide/pheasant research stopped after dieldrin and other organochlorines were removed from the market, and were replaced by carbamates. Carbamates are not as toxic to wildlife because of their shorter field life. Indications are that while carbamates might not kill game birds immediately, they may affect the birds' metabolic rate, thus affecting body fat deposition and winter survival. Research is needed to answer the landowners' question.

Spraying technique can make a difference. Crops can withstand some grasshoppers, but once they reach the economic threshold of $8/yd^2$, spraying is recommended. The intent of spraying is to kill grasshoppers down to $0/yd^2$ ... good-bye pheasant food! Would reducing the hoppers to just below the economic threshold help more chicks' to survival to 10 weeks of age? In England, farmers who did not spray 6% of each field had pheasant's broods (at 10 weeks) two times larger than farmers who sprayed entire fields.

"Hatch Two Nests?"

It is common during the summer to see a hen with two broods, but they are not both hers? Physically it is impossible for her to hatch a second nest. With the first egg laid she started losing weight, and she lays 30 to 35 eggs before incubating a nest of 12 (if you laid 35 footballs, you would be physically pooped). Weight loss continues during 23 days of incubation because she feeds herself poorly. At hatching she starts producing all new body feathers. Still losing weight, motherhood next requires 8 to 10 weeks of chick care. It is now mid-August, and she is at her lowest weight. She has neither the time nor energy to again lay 30 eggs, incubate 23 days, and raise for 8 weeks. Most likely she has adopted an abandoned or lost brood. The hen will readily adopt another brood.

The two broods with the hen are generally 3 to 4 weeks apart in age. Even if the hen hatched her first brood, and immediately started another nest, 4 weeks is not enough time to hatch again. It takes 10 days for her ovary to lay one egg a day, 9 days to fill the second nest, and 23 to incubate.... total of 42 days or 6 weeks. And what are the first chicks doing while mom tries the impossible?

"Hatched?"

June is the peak nest hatching month for pheasants. Let's say you find an empty egg shell, or even a piece of egg shell. Do you know how to tell if that egg hatched successfully? If you have the entire egg shell and the larger end is neatly chipped off (like the egg has a cap), it was probably successful. But a predator could have bitten the end off, so it may not be successful. To be totally sure, look for the skin on the inside of the shell. When you break a chicken egg for breakfast, first you crack the shell then use your thumbs to break through the skin inside the shell. While the embryo develops, the skin is stuck tightly to the shell. When the chick hatches, the skin separates from the shell and dries out. You can easily lift the entire skin out of the shell (looks like a thin paper cup). If the skin is still stuck to the shell, the egg did not hatch.

If you find only a piece of a pheasant egg, again look for the skin. If the skin is stuck to the shell, and you can not pull it easily from the shell, then the egg was not successful. If the skin is not present, it dried up and fell off after hatching.

"Successful First Nest"

It is very important that the hen's first nest be successful. If the first attempt is destroyed by weather, machinery, or predators, the future of the hen and any chicks that she might produce is grim. Recall that each time the hen attempts to nest, her physical condition deteriorates. Ideally the first attempt needs to be successful, so she can sooner begin to prepare her body for next winter. With renesting attempts, she has less time to get ready for winter, and is less likely to survive winter. Also consider that the chicks need plenty of time to grow up, then put on body fat before winter hits. The later the chicks hatch this spring, the less time they have to grow up, and the less likely they will survive the winter.

If a hen hatches her first nest in early June, the chances of her and the chicks surviving next winter is 65-75%. If her first nest was destroyed, and she tries another nest (that hatches in early July), the chance she and the chicks survive next winter is 30-50%. If the second attempt failed and she tries successfully a third time, the chances are 0-10%.

"Imprinting"

Pheasant chicks are precocial, which means they hatch and can leave the nest immediately. This ability is very important to ground nesting birds, as the hatched eggs produce enough aromas to attract predators. So, better be able to leave the nest fast before the fox finds you. With chicks that are able to immediately run around, "imprinting" is very important. A simple definition of imprinting is "learning to follow." The chicks imprint on their hen or learn to follow their hen within a couple hours of hatching. Imprinting is a learned behavior. The chicks must learn who their mother is and to follow her. Some experts believe that this learning process is started before the chicks actually hatch. In fact, hens begin talking to the chicks two to three days before hatching. "How's it going in there, kids?" "Great Mom, but a little cramped!" This communicating through the egg shell helps the chicks to recognize Mom at hatching, and enhances their ability to learn to follow her. This imprinting process insures that the

family stays close together, so the chicks can be better protected.

"Do Embryos Breath?"

Of course the developing embryos have to breathe. Even through the egg shell. The shell is porous enough that oxygen and carbon dioxide can pass readily through it. During the 1960's there was much concern that agricultural chemicals sprayed on farm fields would coat the eggs thus causing the embryos to suffocate and die. Studies with DDT, 2,4-D, dieldrin, and parathion though showed that spraying the eggs had no effect on the embryos' breathing, or hatching. Generally though, the peak spraying occurred when the eggs were covered by a hen. The hen took the brunt of the chemical.

"Aging Chicks"

Pheasant chicks can be aged using feather development. If you capture a chick, or find one road-killed, try to age it. Compare the chick's feather development to the list below. The list works for both roosters and hens.

Week of Age	Feather Description
1-2 days	-flight feathers starting, and has an egg tooth.
1	-wing feathers next to body start growing.
2	-body feathers start on breast & rump, can fly.
3	-feathers everywhere except head, neck, belly.
4	-feathers start on top head.
5	-very little down remaining.
6	-head has pinfeathery look.
7	-roosters show slight red color on head.
8	-roosters red deepens.
9	-first greenish color on rooster neck.

If the body feathers are just starting, and today is June 20th, then the chick hatched about June 6 (June 20 minus 2 weeks) from a nest that started April 29 (June 6 minus 23 days incubation minus 16 days to lay the 12 eggs).

"Peak Hatch"

The time when the most pheasant nests are hatching is called the "peak hatch." Nationally this occurs June 1-15, but may be delayed up to two weeks by cool wet spring weather. Such weather will not hinder incubation of the nest, but could have delayed egg laying late April to early May. During June the chicks are 1 to 3 weeks old. What are they doing then? Trying to stay alive! Their survival will depend on the size of their range, the insects available to them, and their diet.

After 23 days of incubation the eggs hatch. Once the chicks are dry, the hen leads them to suitable feeding areas where they begin feeding themselves. The chicks can not control their body temperature for the first week so the hen periodically broods them to

prevent chilling. The hens call to the chicks even when they are still in the eggs. The hen also warns the chicks of approaching danger with a low pitched call causing the chicks to scatter and then freeze. After the threat is gone, she calls the chicks together with a clucking call. Chicks have three calls... a contentment call, a hurried-caution call, and a plaintive call which attracts the hen and other lost chicks (Hill 88).

"Morality Based On Range"

Chicks are 1 to 3 weeks old, and trying to stay alive. Most mortality occurs during the first 10-12 days after hatching. Their survival depends on the size of their range, the insects available to them, and their diet. Chicks, in their broods, daily move within 225 feet of where they spent the night. During their first 3 weeks their range is 4 to 12 acres. The range increases with chick age.

Broods with the largest ranges tend to suffer the highest mortality. Similarly, the larger ranges tend to contain lower densities of insects. Remember that chicks need protein to grow, so their diet needs to be 90% insects. Therefore broods that are short of food tend to wonder over larger areas and suffer heavier mortality. Movements are greater, ranges are larger, and chick mortality is higher with broods feeding in large monoculture farms. Those living on more diverse farms have smaller ranges and greater survival due to greater insect densities. (Hill 88)

"Mortality Based On Food"

When 1-2 weeks old, the chick's diet is 90% insects. The chick is growing at its fastest rate and needs a diet of at least 27% protein. So chicks eat no less than 22 different groups of insects. England found that 58% of the chick's diet was caterpillars of sawflies and of Lepidoptera (butterflies). Chicks which suffer less then 50% mortality eat 3 times more insects. Predators also increase chick mortality, but some managers note that predation is of secondary importance to insect abundance. The more insects you have, particularly caterpillars, the greater your chick survival. Hens do take their chicks to areas of greatest insect populations. Number one is weedy areas both outside and within crops, with spring wheat being number two. Organic farmers have long known that planting certain plants (weeds) attract many beneficial insects. Home gardeners know what plants attract the most butterflies and their caterpillars. Perhaps the knowledge of these farmers and gardeners could be used on your land to increase pheasant chick survival? (Hill 88)

"Age by Body Size"

Most managers age pheasant chicks very precisely using wing feather and body feather growth. An easier, though less accurate, method of aging chicks is by comparing the chick's body size to that of its hen. A 1 or 2 day old chick is only slightly taller than the hen's knee. At 2 weeks old, the chick stands about 1/4 of the hen's height. At 6 weeks it is half as tall as the hen. At 8 weeks, 2/3 as high. And at 10 weeks 3/4 as high.

Let's say you determine that the brood running across the road is 8 weeks old. If this is August 22nd, you now know the brood hatched around June 27th. This was probably the hen's second nesting attempt since most first attempts hatch the first week of June. You also know the nest was started May 20th (date hatched minus 23 days incubation minus 15 days to lay the 12 eggs (1.3 days per eggs)). Those early May rains may have drowned her first nest. Being her second attempt, her chicks may not survive as well next winter.