

It should be borne in mind that fly trapping is considered only as a supplemental measure in combating the screwworm. Fly breeding must be cut down as far as possible by prompt burning of carcasses, and conditions favorable to screwworm attack must be reduced by arrangements that will provide for the birth of young and such operations as dehorning, branding, etc., out of fly season, and by preventing injuries to the animals. Regardless of the efforts made to find and destroy all dead animals, it is utterly impossible on the vast range areas, often densely covered with brush, to accomplish this objective. Experiments carried out a number of years ago showed that the screwworm fly is capable of traveling considerable distances. For instance, marked flies have been recaptured 15.1 miles from the point of their release. Undoubtedly they go much farther than this. The operation of traps, therefore, serves a useful purpose in picking up the flies that breed in carrion overlooked in the clean-up work, and also those that migrate from adjacent territory.

Cooperative Trapping Increases Benefits

One of the greatest difficulties encountered in fly trapping is that of giving the traps proper attention. It is obviously poor business for ranchmen to purchase traps at \$2.50 to \$3 each and not to keep them in operation; yet this has often been done. The traps will not catch flies if they are not properly baited and emptied at regular intervals and repaired whenever necessary. This means that every trap must be rebaited every 10 days in hot weather and every 20 to 30 days in cooler weather, and the flies must be removed about every 30 days or oftener when they are abundant.

The usual experience has been that farmers and ranchmen neglect the traps during busy periods, and these are often the most critical times. This has suggested the idea of cooperative fly trapping. Such a scheme has been tried in the Menard, Tex., area and has proved workable. The county agent, in cooperation with the Bureau of Entomology, initiated the work and gave it general supervision. Such supervision is very desirable. With the pooled resources of the stockmen a reliable man is hired to care for the traps either at the rate of about 50 cents per trap per month or on a flat-wage basis. The larger the territory covered in the trapping operations, the greater are the benefits. It is believed that the extensive use of this method of screwworm control will be fully justified by the resulting reduction of losses caused by this pest.

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FOALS Deprived of Dam's
Colostrum May be Saved
by Feeding Horse Serum

The difficulty in raising orphan foals is probably greater than that encountered with the young of any other species of farm animal. How much of this difficulty has been due to the failure of the foal to receive the first milk, called the colostrum, is not known, but horsemen have come to recognize the urgency of having the foal receive colostrum from its dam as soon as possible after the new-born animal is able to stand on its feet.

There is a belief, common among horsemen, that colostrum is important chiefly as a laxative to facilitate the early passage of the meconium

from the intestinal tract of the foal. It has been the custom, therefore, when for any reason colostrum is not available for the new-born foal, to administer a laxative to facilitate this elimination. Another role sometimes attributed to colostrum is its high concentration of nutritive elements in a form easily digested by the young animal.

Protective Function of Colostrum

The results of scientific research on the functions of colostrum have indicated also that, in at least some species, colostrum serves to immunize the new-born animal passively against bacteria for which its dam has already acquired immunity. Although in some species the immune substances present in the blood of the maternal animal are transmitted to the fetus through the placental circulation, as in man and the rodents, in other species, including the sheep, cow, goat, and horse, the placenta is of such structure that such transmission does not normally occur. In these last-named species, the blood of the young is lacking in the antibodies, or protective substances, which are present in the blood of the dam. There is, however, in the colostrum a concentration of antibodies several times as great as that in the blood of the same animal. There is further experimental evidence that in each of these types, the suckling young absorbs these substances from the colostrum it ingests during only the first 24 to 48 hours of its life. After this period no such absorption is found.

In 1922, Theobald Smith, formerly of the Department of Agriculture, and Ralph Little published the results of the first of a series of experiments which demonstrated conclusively the essential role of colostrum in the survival of new-born calves. They found that from 75 to 80 percent of calves which did not receive colostrum died of a generalized *Bacillus coli* infection, whereas control calves which received colostrum all survived. Since the organism *B. coli* is nonpathogenic for adult cattle, they concluded that "the function of colostrum is essentially protective against miscellaneous bacteria which are harmless later when the protective functions of the calf have begun to operate." Doctors Smith and Little further showed that calves can efficiently utilize cow serum either fed or injected, as an agent for such immunization, and were successful in using cow serum as a substitute for cow colostrum in rearing young calves.

Experiments with Horse Serum

In an effort to determine whether such findings would apply to equine stock, an experiment was conducted by the Department to determine the effect of substituting horse serum for horse colostrum in the raising of foals when their value justifies such a procedure. The technic for obtaining serum suitable for injection requires greater care than that for material to be fed. Moreover, the technic for injection requires more skill than for feeding. Consequently, in view of the practical nature of this experiment the serum was administered to the animals principally by feeding. A group of 13 new-born foals at the United States Animal Husbandry Farm, Beltsville, Md., was used. All were kept under the same conditions and surroundings and were handled similarly and fed similarly except in respect to the diet they received. The first lot, consisting of 3 foals, received neither colostrum nor serum, but only a milk preparation composed principally of dried

cow's milk, sugar, and water. Although the meconium was passed within 8 hours after delivery, and there were no evidences of constipation, each of these animals showed definite evidences of illness about 40 hours after birth. Two of them lived only 42 and 57 hours, respectively, both dying of septicemia produced by the *Shigella equirulis* organism. The third foal lived 12 days and died of a general septicemia attributed to a strain of *Salmonella paratyphi*, although the *Shigella equirulis* organism was also present in the tissues. Both of these organisms are commonly associated with the so-called "joint and navel ill" in foals.

Shigella equirulis is widespread among horses and in barns but is nonpathogenic to the adult horse. It would appear that the adult horse has built up a resistance toward this and other commonly prevalent organisms, which is transmitted under normal conditions to the foal through the colostrum. But a foal which fails to receive passive immunization through the colostrum or some other source appears unable to combat an infection, when once invaded by organisms.

Another lot of 3 foals was fed mare's colostrum during the first 12 hours after delivery, and mare's milk thereafter. These foals grew normally and had no symptoms of ill health.

Serum Fed Fresh and Dried

The remaining 7 foals received a suitable quantity of horse serum in addition to a milk preparation of the same composition as that fed to the first lot of foals. The serum was fed in two different forms, fresh and dried, both apparently being equally efficacious. The serum was obtained from healthy mature horses by drawing 2 or 3 liters (about 2 or 3 quarts) of blood at a time from the jugular vein. After the defibrinated blood had stood for from 6 to 8 hours, the clear serum was siphoned off the cells. This fresh serum was fed within 5 or 6 days after the blood was drawn.

About 4 liters (about 4 quarts) of serum obtained as described were dried in a partial vacuum at room temperature. This dried serum was fed within 3 months after its preparation. When desired for feeding it was dissolved in sufficient water to make it up to its original volume; that is, about 8.5 parts of dried powder were mixed with 91.5 parts of water. This fluid was then incorporated in the milk mixture and fed to foals. Since in this study the foals were receiving a mixture composed principally of dried milk, sugar, and water, the serum, whether it was fresh or dried and redissolved, was used to replace an equal volume of water in the milk mixture.

Six of the last lot of seven foals were each fed three fourths of a liter (about three fourths of a quart) of serum per 100 pounds of body weight between 6 and 18 hours after birth. Three of the animals received fresh serum, and three redissolved dried serum. In every instance the foal grew as a healthy, thrifty animal, with no symptoms of ill health. In the case of the seventh foal, however, the administration of serum was delayed until from 40 to 48 hours after birth. This foal was definitely ill before serum feeding was begun. No obvious effect was obtained from the feeding of 1 liter (about 1 quart) of fresh serum at this time. Injections of serum on the fourth and fifth days after birth were apparently responsible for a reduction in the swelling of the joints and an improvement in the diarrhea.

Mention has previously been made of the ability of several species of new-born animals, including foals, to absorb protective substances from colostrum fed within the first 48 hours after birth. Experimental evidence on the relation between degree of protection achieved and the age of young animals is limited. Yet, logically, the earlier a foal receives the protective substances in the colostrum or serum, the smaller the quantities required for efficient protection. The small number of animals used thus far in experimental work on this subject and the conditions of exposure do not warrant broad conclusions or recommendations involving the use of horse serum in raising colts. Besides, the limited facilities and the cost of obtaining adequate quantities of the serum will scarcely justify its present use for orphan foals of ordinary grade. However, in the case of valuable foals for which no colostrum is available, the information here presented suggests a promising means of protection against the ills of early life. The services and advice of a qualified veterinarian are advisable in obtaining and administering the serum.

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FOREST Fires in Florida Are Fought with Water and Motorized Equipment The national forests of Florida are highly inflammable because of the character of the ground cover and the common occurrence of relatively high temperatures, low humidity, and strong winds. These last three factors, and the sandy soil tend to diminish the effect of a heavy annual rainfall. Forest fires once started spread with great rapidity. They are usually driven forward by strong winds and make a "run" in a narrow strip a mile or more in length, often developing two or more "heads" or "leads."

The forests are situated in an area of virtually level terrain, and it is possible to drive an automobile or truck through the woods in most places. Longleaf pine is the predominating timber species, with slash pine found on the moist or "pond" sites, which afford the forest protection from repeated fires. In these generally open stands of pine the ground cover consists of grass, scrubby oaks, and an accumulation of oak leaves and pine needles of varying density, depending on the frequency with which a given area has been burned over.

Fires for the most part are confined to small areas because of the prompt discovery made possible by strategically located look-out towers from 80 to 100 feet high. In these towers look-out men, the eyes of the fire-protective organization, are constantly vigilant during periods of probable fire occurrence. They discover the first wisp of smoke and telephone the alarm. Fire fighters and equipment are immediately dispatched to the scene of the fire.

To meet the demand for rapid action in suppressing fires, the forests are gradually being gridironed with roads, motorways, and firebreaks. In spite of these improvements, however, a fire, given favorable conditions, will make a terrific run and jump the firebreaks. In this case the "head" must be stopped at all costs. Once the "head" is stopped, the flanks are relatively easy to extinguish.

During the last decade the use of water and motorized equipment has come to be recognized as an invaluable aid in fire suppression.