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also printed along the top edge. The information we have on this card uses the first 19 digits for animal identification and pedigree. The first 5 numbers, 57029, are the animal's tattoo, or permanent identification. By our system, the 57 designates the year of birth, the 029 shows that it was the 29th calf born that year.

Brevity Via Digits

The next 3 numbers, 008, are the code numbers for the sire of calf 57029. Instead of using the name or registration number of the bull, we assign each bull a code number and use it for our data cards. This makes the sire designation much shorter and easier to read.

The next numbers, 50215, are the dam of 57029. The sire of the dam is next and coded as 021. The following digit, 2, is for the sex of the calf (1 is male, 2 is a female). The 07 shows the age of the dam when the calf was born.

The remainder of the card is used for performance data. The numbers 075 are date of birth, the 75th day of the year (March 16). Her birth weight was 86 pounds. The next array of figures show weight and grade at various ages. As we read the card we see that her weaning weight was 438 pounds, conformation score 11, and condition score at weaning was 10. Weights and grades for 12, 18, and 24 months of age are also shown. The last 2 columns of the card (24) are the deck identification number.

Obviously the individual performance data will vary a great deal among ranches. This, however, is no problem and merely requires that certain fields in the card be assigned to the specific data that are available.

It is Her Diary

Once the individual record cards have been punched they can be used in a variety of ways. One example is shown at the left as a progeny listing by dam. Animal 57029 is now of interest to us as one of the cows in the breeding herd.

The first row of data (see again Page 12) is numbered 00001 and is the record of her own performance as we saw on the IBM card. The subsequent rows show the calves she has produced in the herd and lists their individual performance record.

Other cows are shown with their progeny records. A year number followed by 000 indicates that the cow was dry that year.

Even a brief study of these records would help a rancher in deciding which cows should be culled or saved,

BIG-EYED BUGS AS PREDATORS OF LYGUS BUGS

By G. D. Butler, Jr.

Laboratory studies to evaluate the potential effectiveness of some of the common predators of Arizona cotton fields in the destruction of bollworm eggs were discussed in *Progressive Agriculture* for July-August 1966. Similar studies were carried out during June 1966 on the relative effectiveness of different stages of a big-eyed bug, *Geocoris punctipes*, on lygus bug nymphs. Some 9000 lygus bug nymphs were fed to various predators and 400 daily feeding records determined.

Adult lygus bugs were collected from alfalfa and placed in gallon jars with green beans. Eggs, laid in the beans, hatched in approximately six days and the small nymphs were collected daily for the feeding tests. Small petri dishes were used as arenas and each was provided with a small piece of green bean to serve as food for the lygus bugs. After 24 hours, the number of missing lygus bugs was

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and where to look for replacement heifers.

Similar listings have been made for individual sires and for grandsires. In fact, any type of listing or summary that the owner wants can be quickly made available.

Genetic Correlations

The format presented here is the one we use in our cooperative cattle breeding project working with the Apache Indian Tribe at San Carlos. In addition to sire and dam summary listings we have used these data to determine heritability estimates and to compute genetic correlations among the various traits.

We are now undertaking a detailed study of these data to determine how accurately we can predict the potential lifetime production of a heifer from the records of her own growth performance and the production of direct and collateral relatives. The punch card then, can become a ticket that permits us to enter a whole new world of animal production.

determined and each predator was transferred to another dish with a fresh supply of lygus bug nymphs.

Females Consumed More

The number of lygus bugs consumed by male and female big-eyed bugs is given in Table 1. Females

Table 1. Number of Different-Sized Lygus Bug Nymphs Consumed per Individual *Geocoris punctipes* Adult in 24 Hours.

| Sex of <i>Geocoris</i> | <i>Lygus</i> bug instar | Number of feeding days | Mean No. consumed |
|------------------------|-------------------------|------------------------|-------------------|
| Male | first instar | 63 | 12.1 |
| | second instar | 20 | 4.0 |
| | third instar | 10 | 2.4 |
| Female | first instar | 45 | 25.6 |
| | second instar | 5 | 6.2 |
| | third instar | 7 | 2.6 |

consumed about twice as many first instar lygus bug nymphs as males. The number of lygus bugs consumed decreased as their size increased. This is due to the fact that a third instar lygus bug is approximately the same size as an adult big-eyed bug; therefore the larger lygus bug nymphs may decide not to hold still and may even "bite back."

Newly hatched big-eyed bugs ate a few small lygus bug nymphs, as shown in Table 2, and, as might be

Table 2. Number of First Instar Lygus Bugs Consumed by Individual *Geocoris punctipes* Nymphs of Different Ages in 24 Hours.

| Stage of <i>Geocoris</i> development | Number of feeding days | Mean No. lygus bug nymphs consumed |
|--------------------------------------|------------------------|------------------------------------|
| first instar | 26 | 1.5 |
| second instar | 50 | 2.6 |
| third instar | 48 | 7.4 |

expected, the number of lygus nymphs eaten increased as the size of the big-eyed bugs increased.

Intricate Interactions

(Unfortunately these studies were terminated when Dr. Butler transferred to the USDA Cotton Insects Branch to work full-time on lygus bugs.) These studies point up how sex and the age of the predator, as well as the age of the prey, affect the complex interaction of insect predators and their prey in Arizona crop areas.