Wasp Livens Up Beef Production

REECE I. SAILER *and* BERNARD A. APP

That wasps can liven up the action—be it that of man or beast—is scarcely news. But how can a wasp liven up beef production? The story starts in 1902 when the first seed of a superior grass arrived in the United States. It came from South Africa where it had attracted the attention of empire builder Cecil Rhodes.

Known as rhodesgrass in the New World, it soon became the base of a new empire. Tolerant of heat and drought, the new grass—combined with the heat-tolerant Santa Gertrudis cattle developed at the King Ranch—supported the prosperous cattle baronies of the Texas coastal plains.

Between 1940 and 1942, ranchers began to complain that drought and termites were destroying the previously lush rhodesgrass pastures. Where new pastures had remained productive for 6 to 8 years, they now had to be replanted after 3. Beef production declined and costs increased.

Then in 1942, the cause was discovered. Nico Dias, an agronomist with the Soil Conservation Service, found that plantings of rhodesgrass and perennial sudan growing near Kingsville, Tex., were badly infested with a scale insect.

Scale insects are small, almost minute, insects covered by a protective shell or scale of wax. The newly hatched scale insect, known as a crawler, seeks out a favorable site on its plant host and inserts its sucking mouth parts. Unless it is a male, it remains there for the rest of its life reasonably secure under its protective cover. The males are gadabouts. Once mature, they leave their shelter to seek and mate the females. The protective cover of rhodesgrass scale consists of a white mass of wax filaments. The scales attach around the nodes at the base of the grass blades and form small masses of cottony fluff.

The scale insect near Kingsville was soon identified by Harold Morrison of the USDA insect identification unit as *Antonina graminis* (Maskell). This insect had been found in China and described in 1897. How it got to south Texas is undetermined. In 1960, the scale had been recorded from Florida, along the gulf coast to Texas, and west to southern California.

Most members of the grass family were found to be susceptible to the scale. But rhodesgrass, johnsongrass, bermudagrass, and St. Augustine grass were the scale insect's preferred hosts of economic importance.

Actual losses, though never fully assessed, were great. The King Ranch alone reported loss of 100,000 acres of

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Rhodesgrass, *above;* johnsongrass, *right.*

rhodesgrass pasture between 1945 and 1949. However, reliable interpretation of damage is difficult because of interrelated effects of a scale infestation, drought, overgrazing, and close mowing, often in operation at the same time. It was obvious that while the scale insect alone seldom killed pastures, the infested grass would quickly die if it was either grazed or mowed.

At the request of the affected cattlemen, State and Federal authorities endeavored to restore the productivity of the scale-infested land. Progress was disheartening. Three varieties of bluestem, together with Angleton grass, were found to be resistant or tolerant to scale attack. Unfortunately, none was as productive as rhodesgrass before arrival of the scale. High cost and problems with residues eliminated use of insecticides except for valuable turf areas, such as lawns and golf greens.

Biological control was also disappointing. One promising parasite *Anagyrus antoninae* Timberlake was imported in 1950 from Hawaii. This tiny wasplike insect could not stand the hot dry summer weather of the Texas plains. It did succeed in controlling the scale on paragrass in Florida.

However, in 1956 a USDA parasite explorer, George Angalet, working near New Delhi, India, discovered a small wasp that appeared to control rhodesgrass scale. This wasp was later named *Neodusmetia sangwani* (Subba Rao) and was imported from India in 1959. Entomologists at the Texas Agricultural Experiment Station quickly established that the tiny wasp was highly effective against scale.

The tiny female wasp would crawl from scale to scale stopping only long enough to insert its stingerlike ovipositor and leave a number of eggs in the host's body. The eggs soon hatched and produced small larvae which quickly killed the host. As many as 10 young wasps might issue from a single dead scale insect. The parasite produces a new generation in as little as 27 days. The rhodesgrass scale requires 60 to 70 days to complete a life cycle. At this rate, the parasite could quickly overtake and suppress its host.

During this period in the 1950's, a new variety of grass called Bell rhodesgrass was developed and released which tolerated large numbers of scale insects. When used in conjunction with the parasite *N. sangwani*, the scale population was reduced so low that no loss of yield occurred. Presence of the parasite was shown to increase yields by 30 to 40 percent.

Unfortunately, the female parasites are wingless and thus disperse very slowly. To obtain the maximum benefits in the shortest time, Michael Schuster, Texas A. & M. entomologist, seeded 900,000 acres with grass sprigs infested with parasitized scale.

These sprigs were placed in frozen food cartons and dispersed from low flying aircraft at a cost of 34 cents per square mile.

Thus, more than 25 years after the rhodesgrass scale was recognized as a pest, the solution was achieved. Thanks to the persistence, perception, and ingenuity of agricultural scientists and a tiny wasp from a foreign land, cattlemen of the gulf coast can again produce more beef for the American consumer at a lower cost.

Tailormade Bees Do Honey of a Job

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Bill Nye watched a truck loaded with hives of bees turn off the Utah highway and into a field of flowering alfalfa. As it moved across the field, it stopped every tenth of a mile, and the driver manipulated a hoist that gently set off a dozen hives. They had been picked up with the same hoist the previous evening in California and had been hauled all night. Within minutes after their arrival in the field, the bees eagerly began visiting the alfalfa flowers. In doing so, they accidentally carried pollen from one flower to another.

This cross-pollination results in a bountiful seed crop for the farmer—a benefit that also extends to the beekeeper in pollination fees for the bees, the hay producer who plants the seed, the dairyman who feeds alfalfa hay, and ultimately the consumer of beef and dairy products.

It all started when Nye (William P. Nye of the USDA Bee Research Laboratory at Logan, Utah) wanted to

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