ADULT. Small size, at least one-third less than the common species; reddish-brown when the beetles are newly emerged, becoming very dark-brown with age. The color is evenly distributed and lacks the darker spots that are found on *R. obscurus*. The feet lack the large pads, and the antennal knobs end rather obtusely.

The following description,¹ by William Macleay, from specimens collected in New Guinea, appears to agree for those in hand.

Sphenophorus nebulosus. Reddish-brown, opaque; rostrum thickened and scaly towards the head and with a fine stria along the whole of its length; the club of the antennæ very short and truncate.

The thorax is depressed and black on the median line. The elytra are strongly striate-punctate, the insterstices convex, the whole is indistinctly clouded with different shades of brown; the pygidium is rounded with four raised lines or costæ densely clothed with scales. The femora are unarmed. Length, 3 lines.

Mr. Frederick Muir of the Hawaiian Sugar Planter's Experiment Station, collected specimens of this species in New Guinea, Amboina and Larat.

REMEDIES. The best possible method of control that suggests itself would be to expose all rotten discarded cane to the sun for several days. This could be done either by first burning the trash, which would greatly assist in the destruction, or by having the cutters throw all discarded stalks out on top of the trash.

THE PROBABLE BEST METHOD OF REARING CERTAIN SCARABÆID LARVÆ²

By A. A. GIRAULT

These rough figures concerning three or four types of cages used by us in North Queensland for rearing to maturity scarabæid larvæ of root-feeding habit taken from cane fields and elsewhere, probably indicates the best type or types of cages, but the results are complicated by a number of factors which, so far, we have had to ignore. One of these factors is the relative hardiness or adaptability of the half dozen or so species concerned (*Lepidiota*, *Anoplognathus*, *Xylotrupes Calodes* and so forth). Here all species are taken as equal in this respect, which is very probably not so. Another complicating factor is the number of insects per cage, varying greatly from a hundred or more to three. In 1912, the average number per cage was about ten while

¹ Proc. Linn. Soc. N. S. Wales, 1887, 2d Ser., Vol. I., p. 192.

² Contribution No. 20, Bureau of Sugar Experiment Stations, Bundaberg, Queensland.

in 1913 it was about twenty-five. All of the cages were filled with sifted volcanic soil planted with corn; the larvæ were placed upon this soil and allowed to enter, in this manner selecting the most hardy, since the weaker ones were unable to enter and died upon the surface. The following types of cages were used: ordinary square wooden boxes (18 x 18 inches) kept in and out of doors; the same with wire gauze bottom and buried into the earth; ordinary red, earthenware flower pots kept indoors and wire gauze Tower breeding cages of various lengths buried in the earth for their entire depth. The tabulations are self explanatory, but maturities were counted if the pupa was successfully formed:

Year	Type of Cage	Total No. Larvæ	No. Maturing	Per Cent Maturing
1912.....	Wooden boxes, indoors.....	162	51	31.
	Flower pots, indoors.....	58	18	32.
1913.....	Wooden boxes, indoors.....	1070	47	4.3
	Wooden boxes, outdoors.....	1140	25	2.2
	Wooden boxes, miscellaneous.....	3137	162	5.17
	Flower pots, indoors.....	161	37	23.
	Tower cages, buried.....	431	126	29.
	Wooden boxes, buried.....	405	117	28.8
		6564	583	19.3

It is quite probable that the 1912 results are high because of the fewer cages (only thirty-five), thus not obtaining a true average, but it may be equally probable that they were due to the better attention which each kind of cage received. Thus it would seem that the kind of cage mattered very little, providing they received good attention. The two hundred and fifty or more cages of 1913 were not as well looked after, individually, as were the thirty-five of 1912. Yet, for our purpose, it was much better to use a large number of cages with smaller returns from each, since in 1912 only sixty-nine maturities resulted, whereas in 1913 over five hundred adults were obtained.

A hundred per cent of maturities resulted in two cases in flower pots with three and seven larvæ; in an ordinary box with forty-four larvæ of *Xylotrupes*, 77 per cent matured; with twelve cetonid larvæ in a flower pot 88.3 per cent matured; of twenty larvæ of *Anoplognathus*, 45 per cent matured in the ordinary box; of *Lepidiotia* larvæ, the next largest percentage obtained from one cage was 68 with nineteen larvæ in a wooden box with gauze bottom, sunk into the earth. In two other cages of the same type and with the same species, 66 and 57 per cent of maturity were obtained with twenty-seven and twenty-six units respectively. But in a buried Tower gauze cage of a

depth of forty-three inches, with fifty-five larvæ, 72 per cent reached maturity.

It must be understood that the larvæ reared in these cages were usually a half or more grown before collected, usually remaining in the cages from two to five months before they were ready to pupate.

The best type of cage for this purpose seems to be the Tower cage sunk into the earth, but wooden boxes with gauze bottoms are perhaps equally as good and are much less expensive. Flower pots would be the third choice. Good drainage seems the essential factor from the standpoint of the cage.

THE SERPENTINE LEAF-MINER ON COTTON

By E. A. McGREGOR, *Bureau of Entomology*

In the course of the investigations of cotton insects at Batesburg, S. C., made by the writer¹ during the seasons of 1911, 1912 and 1913, a number of interesting notes have been made on the serpentine leaf-miner of cotton. The insect is a Dipteron, *Agromyza scutellata* Fallen, belonging to the family Agromyzidæ. A general account, under the name *A. pusilla*, was recently published by Webster and Parks. The present paper deals more particularly with the species as an enemy of cotton and is, therefore, supplementary to the recent paper by Webster and Parks in the *Journal of Agricultural Research*.

This species has been identified by Mr. W. R. Walton of the Bureau of Entomology and A. L. Melander of Washington Agricultural Experiment Station as *A. scutellata* Fallen, and by Mr. J. R. Malloch as *A. pusilla* Meigen. Mr. Melander considers *pusilla* a synonym of *scutellata* after making a thorough study of his own and Mr. Malloch's material.

The species is by no means peculiar to cotton. In the United States it has been bred from quite a number of different hosts, representing fourteen families of spermatophytes as shown in the accompanying table:

¹ Both in the field observation and in the work incident to the breeding operations Mr. F. L. McDonough, of the Bureau of Entomology, was of substantial assistance to the writer.