FOOD PLANTS OF SOME BYTHOSCOPIDAE.

E. D. BALL, Utah Ag. College, Logan, Utah.

In giving food plant records it seems desirable to distinguish those records that are the result of repeated observation, or made under circumstances that admit of slight chance for error, from those that are based on accidental occurrence of one or more specimens upon some given plant. The adults of most all of our leaf-hoppers fly very readily and are often found on plants adjacent to the one they feed upon, especially after a sweep net has been vigorously used in the neighborhood. And too often there is no means of knowing whether the record is the result of one accidental specimen or the summation of a life-history study.

The longer the author studies the food plant relations of the Jassidae the more evidence he finds to support the idea that nearly every species has its particular food plant or group of closely related plants upon which it is almost absolutely dependent in part, at least, of its life cycle. In a large number of species the larvae rarely if ever leave the plant upon which they emerge from the eggs. So that the finding of the larvae in any number upon a plant is in a great many cases an almost absolute test of the correctness of the food plant determination.

The following notes are in many cases extracts from almost complete life-history studies and in every case are based on sufficient evidence to almost preclude the idea of an accidental occurrence.

GENUS MACROPSIS.

The following notes complete the food plant list for our forms of this genus, with the exception of one species, and while the genus as a whole presents a remarkable variety of food plants each species seems to be very strictly confined to its particular plant or group of closely related forms. In fact I have even found the presence of a particular species of Macropsis one of the best guides to the determination of the many varieties of one plant species.

M. laeta Uhl.—This species is found only on the bushy species of Sumac (*Rhus aromatica* and *trilobata*), that occur so commonly on the sides of the foot hills and along the bluffs of the streams out on the plains in Colorado. The larvae appear early in July, hiding in the axils of the leaves and in the fruit clusters. They mature early in August, the adults remaining until the middle of September. They are of a bright, shining green color and thus resemble the petioles and new growth upon which they stay.

Var. *paeta* Ball.—Is a pink variety of this species found only in the crimson fruit clusters of this Sumac, where it is well protected

by its resemblance to the fruit stems and also by the sticky nature of the fruit.

M. humilis Stal.—This species seems to be strictly confined to the rayless golden rod (*Bigelovia douglasii* group). The female is of a pale green color, similar to that of the new growth upon which it stays. The male has a shining black stripe down the back and depends upon its agility in dodging around the stems for protection. The adults appear in July, the males having mostly disappeared by August 1st. It is a common species in southwestern Colorado and occurs sparingly well up in the mountains west of Fort Collins, Colo., but has never been taken in the foot hills or on the plains, although the Bigelovia abounds there.

M. robusta Uhl.—This small pale green form is found abundantly on the bushy Atriplex (*A. canescens*) throughout the southern half of Colorado and down into Arizona. The plant appears almost white, but the young shoots and stems where the insects rest are pale green.

M. bisignata Ball.—This pretty brown-marked species occurs on *Gutierrezia euthamiae*, a little yellow-flowered Compositae that grows in small clumps all over the plain region of Colorado and well up into the mountains. There appears to be two broods of this species, one appearing late in May and another in September. The difference in altitude affects the time of appearance so much that it is hard to determine the number of broods except where the same locality is under observation during the entire year.

GENUS PEDIOPSIS.

The food plants of a number of our species have already been definitely recorded and a few more are added here. The willow forms, as far as studied, seem to be as strictly confined to one species or group of willows as are the willow-inhabiting forms of Idiocerus.

P. tristis Van D., and *trimaculata* Fitch.—were both injuriously abundant on cultivated plums at Fort Collins, Colo., in 1902. The adults of the latter species appeared the first week in July and those of *tristis* a week or more later.

P. suturalis O. and B.—seems to be strictly confined to the black willows (*Salix amygdaloides* and *nigra*), where it is fairly common locally.

P. erythrocephala G. and B.—An abundant species on the narrow-leaved willow (*S. longifolia*). By an oversight the habitat of this species was omitted in Osb. and Ball's review of this genus. It is known from Iowa, Nebraska, Kansas and Colorado.

P. trivialis Ball.—This species occurs abundantly on the black willows (*S. amygdaloides*) in Colorado. The adults appear by the first of July.

P. viridis Fitch.—This species appears to be strictly confined to the narrow-leaved willow (*S. longifolia*). The adults appear the middle of June.

GENUS IDIOCERUS.

The American forms of this group have been recorded from only three genera of plants and these all tree forms. The following notes add as many more genera to the list and introduces for the first time strictly bush forms as host plants. Wherever willow forms have been studied they have been found confined to one species or to a group of closely related species of willows and not general feeders as has been commonly supposed.

I. dolosus Ball.—Found only on the bushy Sumac (*Rhus aromatica*) in the mountain region of Colorado. Adults have been taken from the middle of July until late in August.

I. ramentosus Uhl.—Common on *Salix longifolia*, seeming to prefer the short, thick clumps and sheltered locations. Found in Iowa, Nebraska and Colorado.

I. snowi G. and B.—found on *S. longifolia*.

I. lachrymalis Fitch.—found only on the Quaking Asp (*Populus tremuloides*).

I. femoratus Ball.—is a willow form, but has not been found in sufficient numbers to determine which species of willow it lives on.

I. productus G. and B.—is also a willow form.

I. morosus Ball.—This was swept commonly from two species of *Ribes* growing in the foot hills and mountains west of Fort Collins, Colo. It was most frequently met with on the red currant or squaw berry (*R. cereum.*)

I. verrucosus Ball.—was also taken on currants at about the highest altitude at which they grow.

I. ensiger Ball.—This is probably another currant form, though not enough specimens were taken at any one time to eliminate the possibility of it being an accidental capture. There were two very distinct kinds of larvae found together on the squaw berry—one, dark reddish brown that apparently belonged to this species, and a green form that was probably *morosus*.

I. amoemus Van D.—This pretty species lives on the Juniper, where its rufous and green match well with its surroundings.

I. nervatus Van D.—This species has been reported as occurring on willows, but in Colorado it seems to be an inhabitant of the Juniper. It is possible that there are still two species mixed under that name.