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LIFE HISTORIES ON VIRUS-INFECTED AND ON HEALTHY PLANTS

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Genital characters, which are described and illustrated, indicate that the species occurring in California is identical with that occurring in Mexico. Color and markings are described in detail.

II. Transmission of California Aster-Yellows Virus . . . 544

Texananus incurvatus is the seventh phlepsid leafhopper that has been demonstrated to carry this virus. In single-insect tests, its efficiency in transmitting the virus was 22 per cent with celery, 1 per cent with asters. The virus was retained by single adults from 11 to 14 days.

III. Life History on Virus-infected and on Healthy Plants . . 546

The length of nymphal stages of *Texananus incurvatus* reared on healthy and on virus-infected plants did not differ significantly. On healthy plants, nymph mortality was high; on infected ones, negligible.

COLLADONUS GEMINATUS AND *C. MONTANUS*:

Life Histories on Virus-infected and on Healthy Plants . . 553

Comparative life-history studies of these two species (selected for study because they experience no nymph mortality on either healthy or diseased celery plants) show no significant differences in the duration of nymphal stages between specimens reared on healthy celery and those reared on diseased celery. In *Colladonus montanus* the total duration of nymphal stages is shorter for the males than for the females. In both species, males were smaller than females. *C. geminatus* and *C. montanus* do not interbreed.

TEXANANUS INCURVATUS

III. LIFE HISTORY ON VIRUS-INFECTED AND ON HEALTHY PLANTS¹

HENRY H. P. SEVERIN

The duration of the nymphal stages of leafhopper species on virus-infected and on healthy plants is discussed in two recent papers (Severin, 1946, 1950). A similar study was made of the total duration of the nymphal stages of *Texananus incurvatus* on healthy celery and on celery infected with California aster-yellows virus.

Oviposition. The eggs of *Texananus incurvatus* are deposited in a row in slitlike egg chambers in the petiole of celery. After inserting the egg in the petiole, the female secretes a liquid (which becomes white when dry) in the form of threadlike papillae over each egg puncture.

Egg Period. The egg periods of *Texananus incurvatus* were determined with eggs deposited in the petioles during July and August. Each female at the egg-laying stage was confined for 1 day in a cage enclosing a large celery plant. The egg periods required from 18 to 25 days under greenhouse conditions.

Duration of Nymphal Stages. The interval or period between molts (stages or stadia), and the total duration of the nymphal stages were determined on healthy and diseased celery (table 2). The males required from 41 to 54 days, with an average of 46.3 days, to complete the nymphal stages on healthy celery; and from 35 to 62 days, with an average of 48.5 days, on infected celery, or 2.2 days more than on healthy celery. To reach the adult stage, the females required from 43 to 55 days, with an average of 49.2 days, on healthy celery; and from 41 to 77 days, with an average of 50.3 days, on diseased celery, or an average of 1 day more than on healthy celery. The data show no significant differences in the length of the nymphal stages between leafhoppers reared on healthy celery and those reared on diseased plants.

All males passed through 5 molts on healthy celery. One male and one female passed through 6 molts, requiring 41 and 77 days, respectively, to complete the nymphal stages on infected celery plants.

Color of Nymphal Instars, Male and Female. The color of the first three instars is black with white markings on the head, thorax, and abdomen (plate 1, upper section). The bodies of the fourth and fifth instars are mottled brown and white (plate 1, upper section). A detailed description of the color pattern of the adult (plate 1, upper section) is given in the first paper of this issue (DeLong and Severin, 1950).

Mortality. A high mortality of the nymphs occurred when they were reared on healthy celery but was rare on diseased celery plants. Many nymphs died on healthy celery before or shortly after passing through the first molt.

¹ Received for publication July 6, 1948.

TABLE 2
DURATION OF PERIODS BETWEEN MOLTS IN NYMPHAL STADIA OF
***TEXANANUS INCURVATUS* REARED ON HEALTHY AND**
INFECTED CELERY PLANTS

Date hatched	Duration of stadia, days						
	First instar	Second instar	Third instar	Fourth instar	Fifth instar	Sixth instar	Total
Reared on healthy celery plants							
Males							
August 17.....	15	7	9	6	17	..	54
September 29.....	11	7	4	7	15	..	44
September 30.....	9	9	4	5	14	..	41
Average.....	11.7	7.7	5.7	6.0	15.3	..	46.3
Females							
August 17.....	15	9	11	6	14	..	55
September 30.....	7	8	6	11	11	..	43
September 30.....	8	8	6	10	18	..	50
October 1.....	10	8	6	8	17	..	49
Average.....	10.0	8.2	7.2	8.7	15.0	..	49.2
Reared on infected celery plants							
Males							
July 4.....	6	7	7	6	9	..	35
July 4.....	9	8	6	7	6	..	36
August 11.....	12	8	6	11	18	..	55
August 12.....	12	7	5	10	14	..	48
August 12.....	13	11	11	8	15	..	58
August 14.....	16	6	9	11	13	..	55
August 17.....	10	8	7	8	13	..	46
August 17.....	11	10	6	10	11	..	48
August 17.....	11	10	6	10	25	..	62
August 18.....	11	6	9	10	13	..	49
September 20.....	6	6	6	7	12	4	41
Average.....	10.6	7.9	7.1	8.9	13.5	4	48.5
Females							
July 2.....	10	8	6	9	16	..	49
August 11.....	11	7	6	11	13	..	48
August 11.....	11	9	8	9	15	..	52
August 13.....	15	11	6	9	15	..	56
August 14.....	12	7	9	9	14	..	51
August 15.....	20	8	10	21	11	7	77
August 16.....	11	7	7	9	15	..	49
August 17.....	10	6	9	10	14	..	49
August 21.....	11	6	4	9	15	..	45
August 21.....	11	6	6	10	15	..	48
August 22.....	10	6	4	11	14	..	45
August 25.....	9	6	6	8	15	..	44
August 30.....	8	7	12	8	15	..	50
September 30.....	7	5	6	8	15	..	41
Average.....	11.1	7.1	7.1	10.0	14.4	7	50.3

An attempt was made to rear *Texananus incurvatus* on large healthy asters. Single females at the egg-laying stage, each with a male, were confined in cages, each enclosing 10 asters. Ten adults were reared on 1 aster, none on 9 asters. No difficulty was experienced in rearing this leafhopper on diseased asters.

PLANT SYMPTOMS INDUCED BY FEEDING OF NYMPHS

Single noninfective and infective nymphs feeding on healthy and infected celery, respectively, induced a chlorosis gradually spreading on the leaves upon which they fed.

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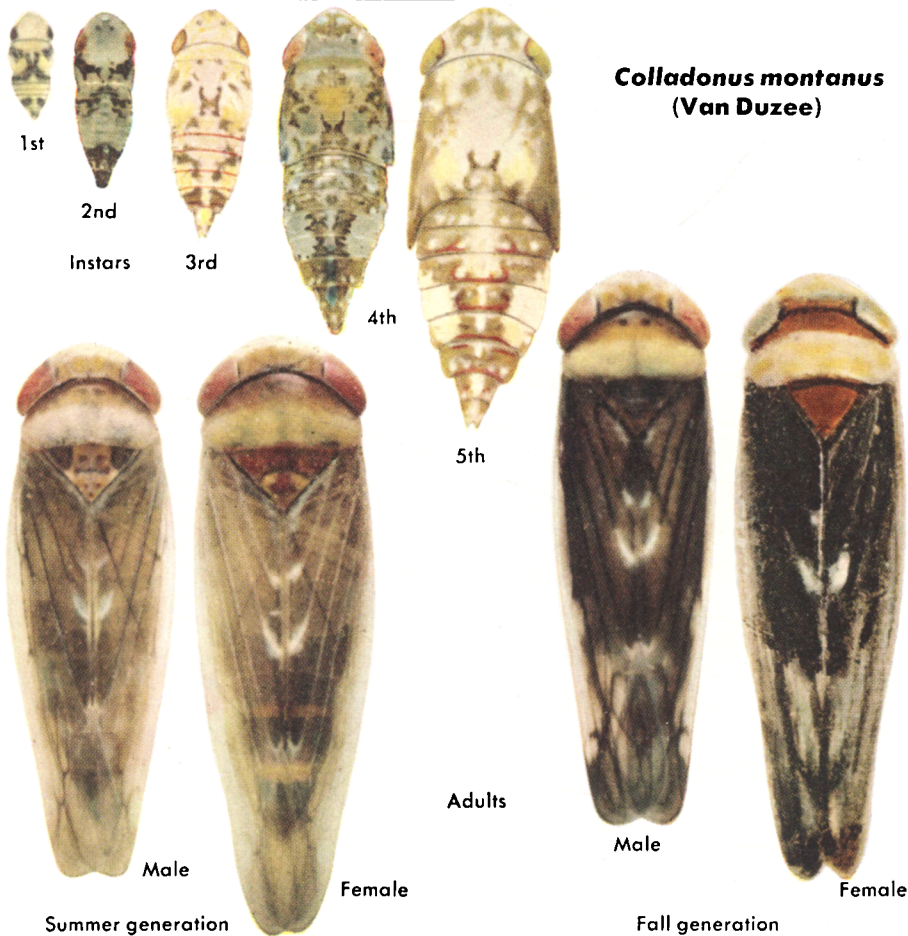
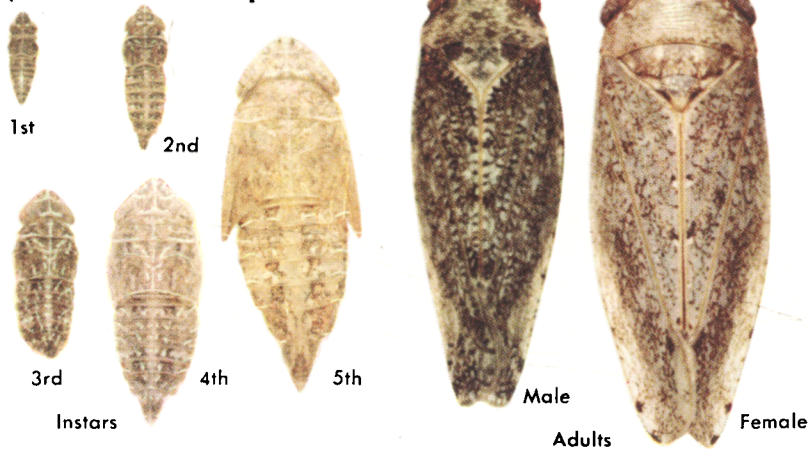
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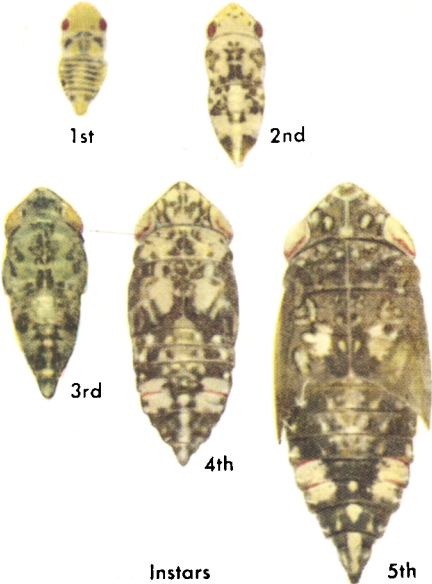
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PLATES

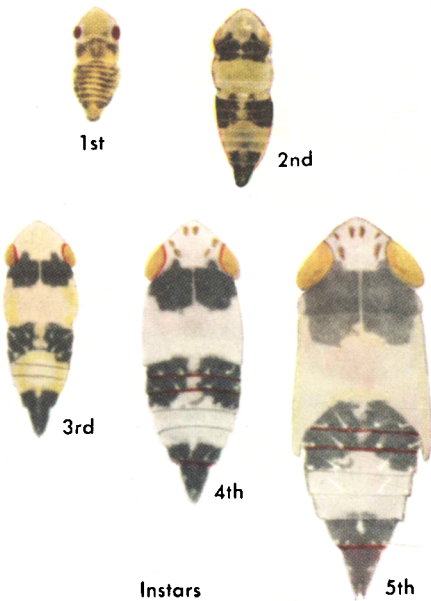
***Texananus incurvatus*
(Osborn and Lathrop)**



Mottled pattern *Colladonus geminatus*
(Van Duzee)



Banded pattern



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