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appears to have resulted largely from reduction in rapid soil moisture evaporation and retarding surface soil movement.

Ten years after treatment a few natural seedlings of quaking aspen (*Populus tremuloides*), bigtooth aspen (*P. grandidentata*), and jack pine had become established in some of the broadcast brush areas. None were noted in the unprotected areas.

These studies indicate that it is feasible to reclaim Big Prairie and similar sandblows directly by planting trees, especially if brush is broadcast between the rows of trees. Since these studies were established, a large part of the open sand area has been planted with trees, chiefly red pine, Scotch pine and jack pine. The blowing of the soil has been essentially stopped with the result that this area no longer is a menace to surrounding lands. These methods have been applied successfully on sand dune and sandblow plantings made to the west of this area. Similar methods have also proved successful in Vermont (Kelly et al., 1948).

LITERATURE CITED

KELLY, JOSEPH B., MIDGELEY, A. R., AND VARNEY, K. E. 1948. Revegetation of sandblows in Vermont. Vt. Agr. Exp. Sta. Bul. No. 542. 16pp., Illus.

SOME RELATIONSHIPS BETWEEN THE DEVELOPMENT OF THE FIRST GENERATION LARVAE OF THE EUROPEAN CORN BORER (PYRAUSTA NUBILALIS HUBNER) AND TEMPERATURE UNDER FIELD CONDITIONS

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ABSTRACT

A study was made in 1950 and 1951 on the development of first generation corn borer larvae on eight different lines of field corn. The cumulative effective temperatures required for the larvae to reach different instars were calculated by using two thresholds as the base temperature: 50° F, a threshold extrapolated from the linear portion of the temperature-rate of development curve, and 36° F, a threshold extrapolated from the curved portion of the same curve. Both of these temperatures were used by Caffrey and Worthley (1927).

It was found that the development of borer larvae in relation to the cumulative effective temperature was, in general, very consistent in the two years, in spite of the fact that the eggs hatched and the larval populations were examined on different dates in the two years. This was true whether 50° or 36° F was used as the base temperature in calculating the effective cumulative temperature. Furthermore, the configuration of

the two curves was the same in spite of the fact that the two base temperatures used differed by 14 degrees.

The reason for this consistency is that all the daily mean temperatures during the period of study in both years were higher than both of the two base temperatures used. It was further reasoned that any temperature may be used as the base temperature to produce the same consistent relationship between temperature cumulation and insect development as long as this temperature is lower than the lowest daily mean temperature during the annual periods for all the years involved.

LITERATURE CITED

CAFFREY, D. J. AND WORTHLEY L. H. 1927. A progress report on the investigations of the European corn borer. U.S.D.A. Bull. No. 1476.

A SURVEY OF THE LEECHES (HIRUDINEA) OF THE DULUTH AREA

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ABSTRACT

This is a preliminary report of a much more extensive study of the taxonomy, ecology, and anatomy of the leeches that have thus far been found in the small lakes and streams within the city limits of Duluth.

Of the 150 species that have so far been found in the world, 44 have been reported within the United States. Moore, in 1912, in his "Leeches of Minnesota" records 21 species. No systematic work has been done on leeches in Minnesota since then.

The 15 species of leeches that have so far been collected and identified in Duluth waters by the author are the following: *Glossiphonia camplanta, Placobdellaa montifera, Placobdella rugosa, P. parasitica, Hemiclepsis occidentalis, Piscicola geometra, Macrobdella decora, Haemopis grandis, H. laterialis, H. marmoratis, Eropobdella punctata, Nephelposis obscura, Dina parva,* and *D. fervida.*

Of those listed,*Piscicola geometra* is reported from Minnesota for the first time, and has been reported only twice previously in the United States. It is a small leech, about one inch long. Both the oral and caudal suckers are slightly larger in diameter than the largest part of the body. The caudal sucker has 14 oculiform markings separated by a corresponding number of dark rays.

There is a discussion of the criteria used in identifying leeches. These include food, habits, habitats, mouth presence or absence of a proboscis, the degree of branching of the stomach and intestine, the number and position of the reproductive organs, and the number and kind of eyes.

The value of this research lies in the knowledge it affords as to the distribution, occurrence, and habits of some of the Minnesota leeches,

and in the reporting for the first time in Minnesota of an additional species, *Piscicola geometra.* There are now at least 22 species of leeches to be found in the state.

THE EFFECTS OF IONIZING RADIATIONS ON ASCARIS EGGS

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ABSTRACT

The fertilized uterine eggs of the pig nematode, *Ascaris lumbricoides suum,* were exposed to x-ray and gamma rays while still in the one-cell stage. A 100 kv. x-ray machine and a 325 curie Co-60 source supplied the ionizing radiations. After exposure the eggs were placed at an optimal developmental temperature of 30-31°C. Unirradiated controls were similarly placed. Two criteria were used to measure the effects of the irradiations, namely, the delay in the cleavage time and the decrease in the percentage of eggs completing embryogenesis.

As the eggs were incubating, samples of 400 eggs each were observed periodically. From each group the average cleavage stage was calculated. The cleavage stages during the first 100 hours of incubation were observed for eggs irradiated with doses ranging from 7,500 r to 60,000 r. With each increase in dose there was a corresponding decrease in the cleavage stage for a given number of hours of incubation. For example, after 41-43 hours of incubation at 31°C., of the eggs receiving 7,500 r, 15,000 r, 30,000 r, 45,000 r, and 60,000 r, 51.3%, 21.7%, 17.0%, 7.7%, and 3.3% respectively had attained the first cleavage stage. During this same time the unirradiated controls had reached the 73.5% first cleavage stage.

The 50% first cleavage time was observed for unirradiated eggs as well as for eggs receiving up to 312,000 r. There was a gradual increase from approximately 36 hours for unirradiated controls up to 100 hours for a dose of 312,000 r. As doses were further increased cleavage was prevented. After exposure to 375,000 r approximately 97.5% of the eggs divided, while after exposure to 735,000 r cleavage occurred in only 7.5% of the eggs.

The percent survival (completion of embryogenesis) was observed after 15 days of incubation at 30° C. This percentage was calculated by taking 4 aliquots of 200 eggs each from the given irradiated sample. The average survival secured from these four samples gave results that were consistently within the 5% confidence limits. An S-shaped dose-survival curve was obtained. At doses of 12,000 r or less there was very little decrease in survival (from 97.5% to 89%). Following this there was a

very sharp decrease in survival for doses up to 60,000 r (from 89.5% to 5.4%). At 96,000 r there was still 1% survival. No eggs survived 144,000 r.

In general, it may be concluded that the differentiation process of *Ascaris* eggs, as indicated by survival percentages, was more radiosensitive than was the ability to carry on cell cleavage.

OBSERVATIONS ON THE MAMMAL-NEST BEETLES

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ABSTRACT

Specimens of *Leptinillus validus* (Horn, 1872) were recently acquired by the Department of Entomology of the University of Minnesota from Mr. Milton Stenlund of the State Department of Conservation. Mr. Stenlund stated that they were obtained from the fur of both living and dead beavers trapped during a recent survey of the incidence of tularemia among Northern Minnesota beavers.

These specimens constitute the first Minnesota record of this species and the second instance of its capture in the United States. The beetles have been taken previously from beavers in the state of Maine.

Although present literature records indicate the species has been taken only in Alaska (1889) and the Hudson Bay area (1872), correspondence has revealed records in the Canadian Provinces of Ontario, British Columbia, and Quebec in addition to those previously mentioned.

Little is actually known about the biology of any member of this family and a number of conflicting opinions exist concerning the habits of the most familiar member of the family, *Leptinus testaceus* Mull. However, in view of the extensive studies of Ruschkamp (1914 & 1921) it would appear that *L. testaceus* is an ectoparasite of small field rodents and insectivores, at least during a part of its adult life. The larvae are believed to exist as scavengers in the nesting debris where they are found.

In the case of *Leptinillus validus,* there seems to be a more permanent relationship between the beetle and the host. Both the adults and larvae have been taken from the fur of the beaver with very few exceptions (Parks & Barnes, in press).

In view of this more permanent relationship in contrast to that presented by *Leptinus testaceus,* it is believed that these associations might very well demonstrate progressive steps in the evolution of an obligate parasite relationship.

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A COMPARISON OF RATE OF LEAF INITIATION IN SEEDLINGS OF ZEA MAYS L. UNDER FIELD AND GROWTH CHAMBER CONDITIONS

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This study on seedling growth of *Zea mays* L. is concerned with the rate of leaf initiation under experimental conditions as compared with field conditions. It was conducted in order to determine the experimental conditions necessary for the production of plant growth similar to that under field conditions. Three different environmental variables under artificial conditions were introduced. The criteria used for evaluation of the results obtained were, (1) the number of leaves produced during the seedling ontogeny of the shoot apex, and (2) the duration of the corresponding plastochrons. In addition limited observations were made on internode elongation.

MATERIALS AND METHODS

Four experimental runs of seedlings were conducted. Experiment 1 was grown under fluorescent lights, experiment 2 under incandescent lights, experiment 3 under incandescent lights with the addition of a nutrient solution and experiment 4, the control, under 1954 field conditions.

The seed used was the F_1 hybrid from the cross of Minnesota Station inbreds A188 x A25 . The first three runs were conducted in a constant temperature chamber, and except as noted, treatment of these was identical. The seed was surface sterilized in a 0.1% solution of mercuric chloride, soaked in water for 12 hours, then planted in washed sand in metal flats in the constant temperature chamber at $26 \pm 2°$ C. Planting distance was 4.5 x 4.5 cm. The fluorescent lighting apparatus consisted of a bank of twelve 40 watt tubes suspended 76 cm. above the