A PROGRESS REPORT OF INVESTIGATIONS CONCERNING
THE SYMPHYLID AND ITS CONTROL
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Description

The symphylid, Scutigerella immaculata Newport, is a small white centipede-like animal which has become a serious pest to truck, nursery, vegetable crops in both field and greenhouses. Its economic importance has been generally restricted to the field in the past, but recently it has also become a serious menace to greenhouse crops.

Seasonal History and Habits

Adult and larval forms may be found in any month of the year, but in general the population reaches a peak during July and August. Adults are recorded as living for several years.

Symphyllids are very sensitive to changes in soil temperature and moisture and will migrate from 2 to 3 feet into the subsoil when conditions in the top soil are unfavorable for their development. They are generally found in the first six inches of soil during the summer months.

Host Plants

There are no known plants which are resistant to symphylid attack. Their damage is usually more severe to row crops such as beans, peas, corn, etc., but they are known to attack certain grain and cereal crops which are broadcast. The known host list of this pest includes 86 plants. The more important crops attacked by symphyllids in Oregon are listed as follows:

<table>
<thead>
<tr>
<th>Alfalfa</th>
<th>Black locust</th>
<th>Chrysanthemum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus</td>
<td>Cabbage</td>
<td>Corn - field</td>
</tr>
<tr>
<td>Aster</td>
<td>Calendula</td>
<td>Corn - pop</td>
</tr>
<tr>
<td>Barley</td>
<td>Caragana</td>
<td>Corn - sweet</td>
</tr>
<tr>
<td>Beans - common</td>
<td>Carnation</td>
<td>Cucumber</td>
</tr>
<tr>
<td>Beans - lima</td>
<td>Carrot</td>
<td>Daisy</td>
</tr>
<tr>
<td>Beans - soy</td>
<td>Cauliflower</td>
<td>Egg plant</td>
</tr>
<tr>
<td>Beets - garden</td>
<td>Celery</td>
<td>Gardenia</td>
</tr>
<tr>
<td>Beets - sugar</td>
<td>Chard</td>
<td>Gourd</td>
</tr>
</tbody>
</table>
Grasses  |  Poppy  |  Spinach
Lentil   |  Potato  |  Squash
Lettuce  |  Pumpkin |  Tomato
Muskmelon |  Radish |  Turnip
Oats     |  Rose    |  Vetch
Onion    |  Russian olive |  Violet
Peas     |  Snapdragon |  Watermelon
Pepper   |  Tobacco |  Wheat

Control Measures

The Department of Entomology has been working on symphylid control since 1937, but thus far no practical control has been developed. The following is a brief progress report of the control work thus far attempted.

Commercial Fertilizers: These have been tested extensively, and calcium cyanamid, calcium nitrate, ammonium phosphate, ammonium sulfate, and sodium nitrate at times were noted to sufficiently stimulate plants and enable them to withstand symphylid attack. These materials, however, had no control value. Lime has been applied at the excessive rate of ten tons per acre without being effective.

Cultural Methods: None of the cultural methods attempted have given much promise. Flooding has been practiced in California with success, but the topography of Oregon soil makes this practice impractical. Summer fallow has not been successful because of the longevity of the symphylid. The planting of crops when soil has been on the dry side has in certain instances enabled growers to obtain satisfactory stands. This, however, is not without exceptions and is generally subjected to climatic variability.

Chemical Control in the Field: Approximately 60 different chemicals have been tested in various rates and manners but thus far no practical control remedy has been devised. Some of the ineffective materials are listed as follows:

- Napthalene
- Paradichlorobenzene
- Calcium Cyanide
- Carbon disulphide
- Copper cyanide
- Lead arsenate
- Lime sulfur
- Sulfur
- Nicotine sulfate
- Derris
- Tobacco dust
- Carbon tetrachloride
- Selenium
- Borax
- Rock salt
- Phenothiazine
- Quassia
- DN-dust
- Calomel
- Metaldehyde
- Calcium arsenate

Control by chemicals generally centers about soil fumigants and the most effective fumigant thus far tested is chloropicrin. This material is very toxic to symphilids and other soil organisms. Chloropicrin-treated soil generally produces crops of increased vigor and yields. The limiting factor in the use of this material is its prohibitive cost. It must be used at approximately 250-300 pounds per acre to be effective and the monetary expenditure for chloropicrin at these rates varies between $200 and $300 per acre.
In greenhouses, symphylid control is greatly simplified by the use of raised benches. Steam, chloropicrin, hot water, and other agents can be used to eradicate the pests from benches of this type. No tests have been made with electrical soil sterilizing equipment, but in all probability these also would be quite satisfactory. In ground benches the control problem is similar to that of field conditions and it is nearly impossible to sterilize soil to any great depth. Most success thus far has been obtained by planting an inexpensive trap crop (spinach, lettuce, etc.) and thus bringing the symphylids to the upper layer of the soil before applying any control measure.

Suggested Control Measures:

Symphylids are likely to be quite serious during a wet spring. The following suggestions have been found satisfactory in some instances, but are not infallible:

1. Thorough pulverization of soil and elimination of clods tend to reduce symphylid populations.

2. Planting of seeds and plants when soil is on the dry side. Symphylids will migrate into subsoil under these conditions, and better germination may be effected.

3. The use of commercial fertilizers will often sufficiently stimulate plants and enable them to produce satisfactory crops. Manure provides humus and holds moisture readily. This is desirable in gardens; but unfortunately, symphylids apparently develop very readily in manured ground, and the advantage of manure may be offset by increased symphylid population.
Fig. 2 -- Symphyllid Injury to Germinating Corn.  
Note Symphyllid on Stem of Upper Right.

Fig. 3 -- Symphyllid Injury to Germinating Peas
Fig. 4 -- Symphylid Damage to Russian Olive Planting,
    Oregon State Nursery

Fig. 5 -- Symphylid Damage to Bean Planting,
    South Farm, Oregon State College