

Statistics from Lure and Trap
Development of the Long-Tailed Silverfish
(*Ctenolepisma Longicaudata*) Trap by
Silverfish AS

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28.03.2020

Preface

Silverfish AS has developed a trap and lure for long-tailed silverfish (*ctenolepisma longicaudata*). The trap is made of plastic and the silverfish climb up its surface and fall into an inner, lure filled cup. The lure is non-toxic and made entirely of foods intended for human consumption. Due to the oils in the lure the long-tailed Silverfish die within seconds or minutes.

During development of the trap and lure, field tests were carried out by Silverfish AS in a number of private homes, a kindergarten and two office buildings in Langhus and Oslo, Norway. The primary object of testing was to improve the trap and lure by comparison of lure ingredients and trap designs. This necessitated a reasonable amount of long-tailed Silverfish caught at all times and did not allow for tests on how quickly the number of long-tailed silverfish can drop.

Reporting on the number of trapped long-tailed silverfish vs. time is a secondary use of the statistics. The numbers are biased as they don't include all the changes throughout the testing. Changes such as the number and placement of traps, new trap designs, failed traps and modifications to the lure are only included for major events.

Only 3 locations are included in this report. These are the sites that allowed frequent visits over time with a reasonable number of long-tailed silverfish caught in multiple traps. Many sites are left out of the report due to few data points or too few long-tailed silverfish to be prioritized for continued data collection.

Most of the testing in this report is carried out using prototype traps. Comparison of prototypes and mass-produced traps show the same level of effectiveness in both.

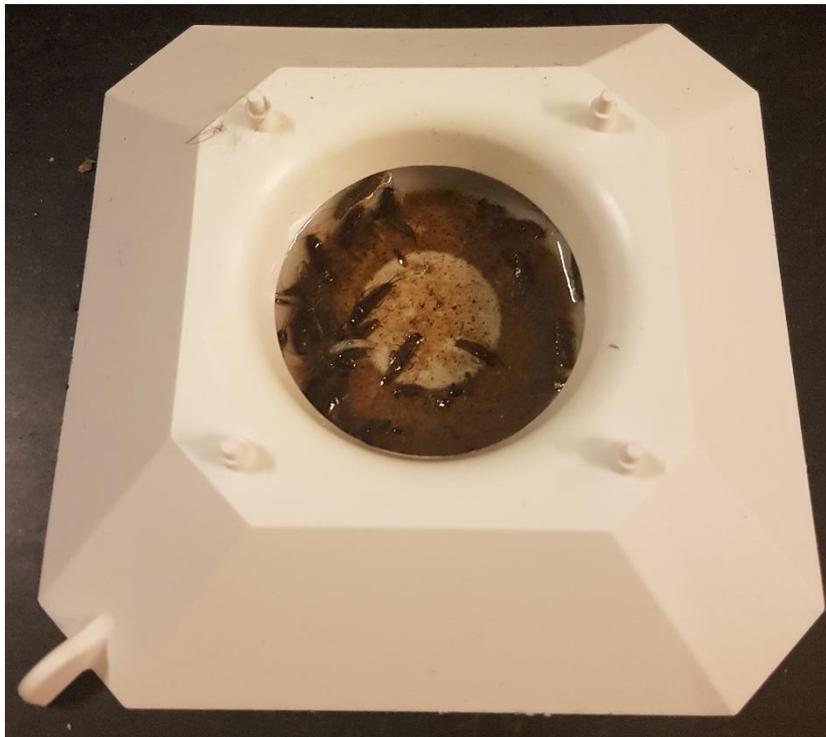


Image 1: Trap with cup, lure and long-tailed silverfish. Lid has been removed.

Field experiments on long-tailed silverfish are difficult as it is hard to control important variables. Low outside temperatures are compensated by heated floors and increased temperature in technical rooms. Laundry rooms in homes are often a primary hideout for long-tailed silverfish, but the

humidity level, hours of darkness and disturbances are far from constant. Removal of food sources through vacuuming and cleaning is only done once in a while. There seems to be changes to long-tailed silverfish movement patterns throughout the year. Numerous informants have reported a rise in observations at some point from September through January. Some have also reported significant changes in observations attributed to major temperature differences of their own and neighboring apartments.

The data does not distinguish long-tailed silverfish by size, stage or features. We did see various other insects in the traps, but only counted long-tailed silverfish, except for one location where springtails were assumed to be small silverfish. No other silverfish species have been observed in the included test sites.

Test site 1: Private house including a rental apartment

This is the initial test site. Ad hoc testing was carried out prior to the start of proper data collection. The number of long-tailed silverfish was initially counted daily, but was later adjusted to 3 and then 2 times a week. It was later performed sporadically. The number, design and placement of traps is not constant. A total of 2797 long-tailed silverfish¹ were trapped during 326 days of data collection. A majority was trapped in one room. The total number of long-tailed silverfish trapped in this house is likely around 4000, including those caught before and after data collection.

¹ A number of springtails were accidentally counted as small long-tailed silverfish. They only account for a fraction of the total count, but the ratio of trapped springtails to silverfish seemed to increase during the test.

Silverfish in traps - 7 day accumulation/weekly average

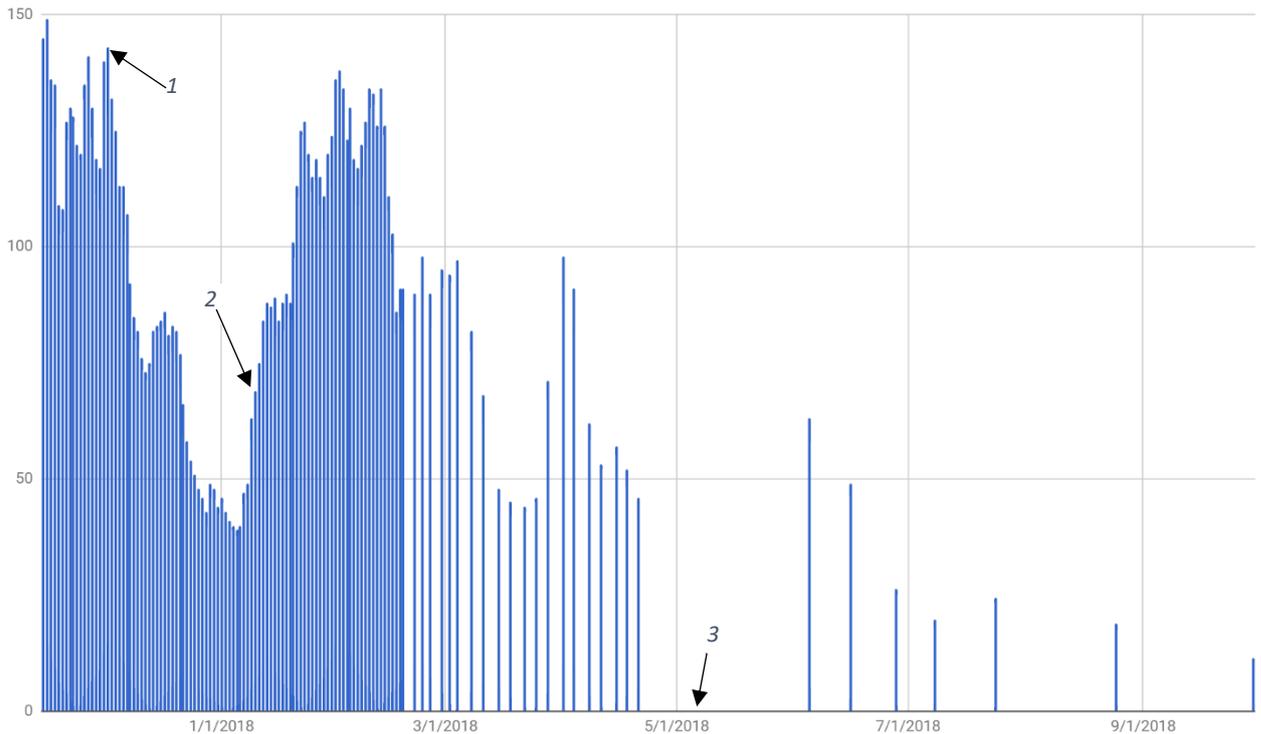


Figure 1. Date format is MM/DD/YYYY. Before arrow 3 each bar represents the total number of long-tailed silverfish trapped the last 7 days. After arrow 3 the bars represent the average weekly number of trapped long-tailed silverfish since last reading.

Comments to Figure 1:

- Arrow 1 denotes the change from two large electric water heaters to a well-insulated heat pump that caused a significant reduction in the room temperature of the primary room of traps. As long-tailed silverfish increase their activity and development at suitable temperatures, the decline can partially be attributed to this change of climate.
- Arrow 2 denotes a significant change in lure in selected traps. Eventually most traps get the new lure.
- During the 6-week period denoted by arrow 3 the house was not inhabited and additional traps were placed in new areas of the house. This also marks the change from biweekly readings with 7-day accumulation to sporadic readings with weekly averages.
- The last four readings do not include springtails.
- Traps were also placed in the rental apartment but is omitted from this analysis as the reading schedule differs.

Inhabitants of test site 1 reported significantly fewer sightings of long-tailed silverfish in 2018 than in 2017.

Test site 2: Private house, semi-detached

This site was almost exclusively used for lure testing. The number of traps and position of traps with significant catch was close to constant. This is a semi-detached house and more than 60% of long-

tailed silverfish were caught in a room next to the neighbor. The neighboring section was uninhabited at times with possible changes in long-tailed silverfish activity and migration between sections due to temperature change and variations in disturbances. A total of 678 long-tailed silverfish were counted in the traps during 108 days of data collection. 8 traps were used throughout most of the test.

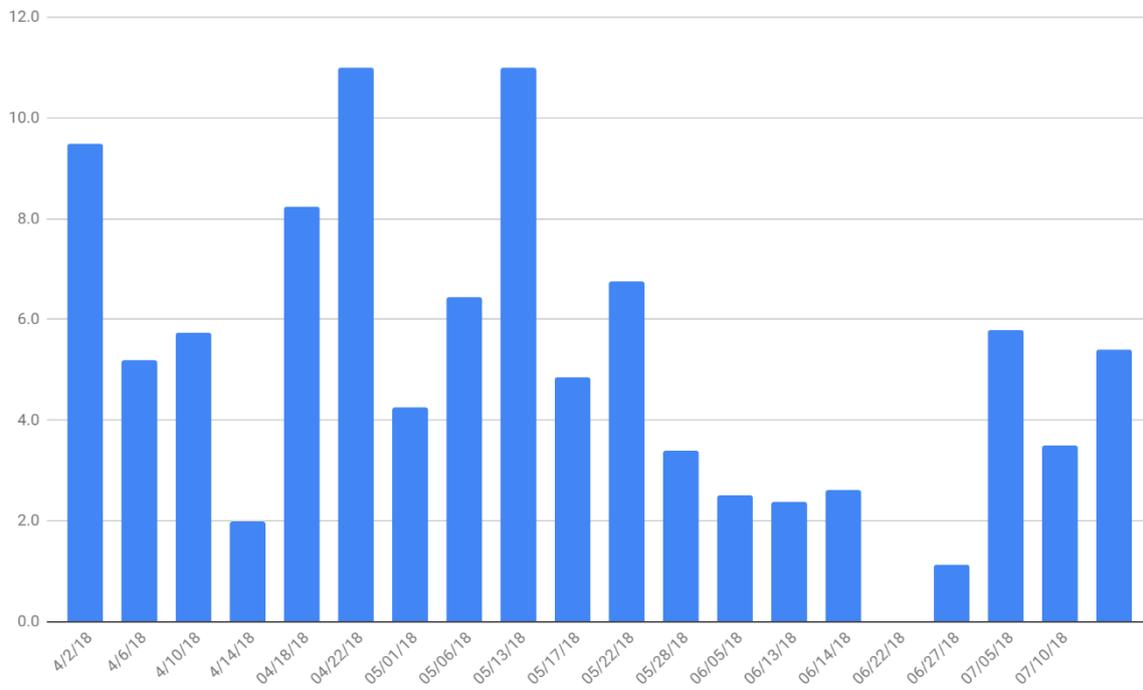


Figure 2. Date format is MM/DD/YY. Average catch per day in all traps.

Comments to Figure 2:

- For the 0 reading near 06/22/18 the lure was changed one day after the previous reading. No long-tailed silverfish were caught in the trap during that day.
- The summer of 2018 was exceptionally hot and average indoor temperature increased as no AC was available. During this period we saw an increase in trapped long-tailed silverfish in the kitchen. This room had a higher count of traps than other rooms. It is likely that the long-tailed silverfish sought out this room as they may now have found favorable temperature and humidity close to a food source.

After about 6 weeks inhabitants of the house noted that there was a significant decrease in the number of long-tailed silverfish observed.

In a room with few silverfish a standard glue trap with some cricket flour was left for 36 days without catching a single long-tailed silverfish. Afterwards a trap in the same location with lure from Silverfish AS caught 10 long-tailed silverfish in 22 days.

Test site 3: Private house with two rental apartments

Inhabitants of test site 3 rarely saw long-tailed silverfish unless they entered the basement of their house that was just some years old. Only the main part of the house was used in testing, no data was

collected from the rental apartments. The test site was mostly used to compare different lure recipes. The number and placement of traps was changed once. Towards the end of testing some prototype traps were replaced by injection molded traps of the type that is currently produced by Silverfish AS. During the first period of 8 days a single trap caught 102 long-tailed silverfish. Almost 60% of total catch was done in one small room that initially had one trap and later had two traps next to each other. In total 1061 long-tailed silverfish were counted in the traps during 212 days of data collection.

Average daily catch

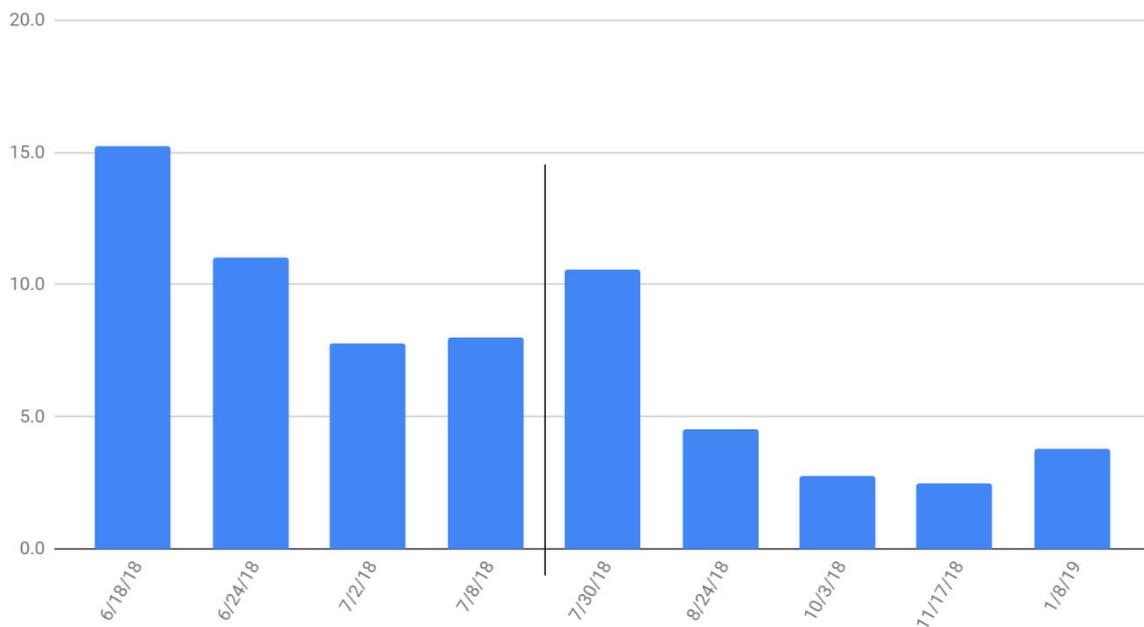


Figure 3. Date format is MM/DD/YY

Comments to Figure 3:

- The number of traps is increased from 4 to 8 after period 4 marked by the vertical black line.
- A number of events take place in the last periods. New traps are introduced. Onset of winter may cause increased long-tailed silverfish activity as they mostly reside in a technical room with an electric heat central that gets hotter as outside temperature drops. A cat ate some lure potentially including some long-tailed silverfish. A basement room between the main rooms with traps was for some time inhabited causing more disturbances for the long-tailed silverfish.

Inhabitants did not note a significant change in sightings of long-tailed silverfish as they had not seen many at any time.

Conclusion

We have studied catching long-tailed silverfish with trap and lure from Silverfish AS in houses with a high number of insects catchable in predictable locations. Although the primary object of the studies has been to aid development of an effective lure and trap, we have also reported on the number of

long-tailed silverfish trapped over time and the corresponding sightings subjectively reported by inhabitants.

We see that placing traps from Silverfish AS in optimal locations leads to significant drops in the number of long-tailed silverfish. The reduction is not as quick as found by the Norwegian Institute of Public Health using Advion Cockroach gel. Traps and lure from Silverfish AS are a non-toxic alternative that can reduce the number of long-tailed silverfish to tolerated amounts within a few months and give further continuous reduction.

The location of traps is paramount. We have seen that a few traps placed near the hideout of the long-tailed silverfish will contribute to the majority of the catch. Our data also indicates that the number of trapped long-tailed silverfish correlates to the size of the population and temperature.

We have not carried out tests trying to quantify how quickly the number of long-tailed silverfish can be reduced by using traps and lure from Silverfish AS. Neither have we made extensive comparisons to other available traps on the market. Our understanding is that it would be better if this was undertaken by an independent third party. The Norwegian Institute of Public Health has expressed interest in doing tests with our traps and lure, but have so far not had the capacity to prioritize this in their laboratory or field tests.