

Animal behavior: pillbugs and their preferences essay



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The being used in this experiment is *Armadillidium vulgare* which is normally called a pillbug, sowbug, or fatso. The pillbug belongs to the Kingdom Animalia, Phylum Arthropoda, Class Crustacea, and Order Isopoda. To understand this experiment it is of import to hold some cognition of the being being observed. The pillbug is an isopod. The pillbug is made up of three organic structure parts. They are the caput, thorax, and venters. This being has two braces of aerial (one prominent and one invisible) , simple eyes, seven braces of legs, seven separate sections on the thorax, and paired extremities at the terminal of the venters called uropods. The colour varies from dark grey to white with form or white without form. Male and female pillbugs differ in that a female has leaflike growings at the base of some of its legs. The intent of these pouches is to keep developing eggs and embryos. Males differ in that the first two extremities on their venters are extended coital variety meats. The immature isopod looks like an grownup, salvage for its size, proportion, colour, and sexual development. The pillbug is of the Order Isopoda. Isopods provender on dead or disintegrating workss or animate beings. Some isopods may eat life workss. They breathe with gills, and hence their home grounds are topographic points of high humidness. During the twenty-four hours, pillbugs hide in moist topographic points, such as under rock and bark. The being being observed reproduces on land alternatively of in H₂O. The eggs develop in a brood pouch filled with fluid. This being produces between one and two broods. This depends upon the female ' s size and status. The female may halt turning under emphasis. This decreases the likeliness of reproducing more than one time. The pillbug society is patriarchal. The tunnel in which a pillbug household lives is guarded by the male parent. Both the male parent and female parent gather

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the nutrient. The full pillbug household cleans the tunnel. The immature set out in February to make households of their ain. Pillbugs are known for their defence mechanism of curving up into a tight ball.

As for the impact of isopods ' impact on the ecosystem, there are both positive and negative effects. Isopods cause minimum dirt betterment and supply a nutrient beginning for other animate beings. Large populations of isopods can eat and do harm to workss. The function of the pillbug in the ecosystem is interrupting down dead workss and animate beings. Pillbugs that live in gardens help the circulation of dirt, but it ' s possible they will eat little workss as they germinate. Overall, pillbugs have a little impact on the ecosystem.

To understand this experiment it is besides of import to be slightly knowledgable on ethology, the survey of carnal behaviour. Behavior is defined as an animate being ' s response to centripetal input. There are two classs that a behaviour can fall into. They are learned and innate. The behaviour that places an animate being in its favourite environment is called an orientation behaviour. When an carnal moves toward or off from a stimulation, it has exhibited taxis. Light, heat, wet, sound, or chemicals are frequently the stimulations that cause taxis. Random motion that does non ensue in orientation with regard to a stimulation is known as kinesis. Another type of behaviour is Agnostic behaviour. This is exhibited when animate beings respond to one another by aggressive or submissive responses.

The pH of dirt varies depending on the dirt ' s status. There are workss that grow best when the dirt is acidic, and there are some workss that grow best

when the dirt is basic. Most works, nevertheless, show the best growing in countries where the pH ranges from 6.5 to 7.2, 7 being impersonal.

Hydrochloric acid and Sodium Hydroxide have pHs at the extremes of the pH graduated table. The pH of Hydrochloric acid, HCL, (0.1 M) is about 1.1. Sodium Hydroxide, KOH, (0.1 M) has a pH of about 13.5. Detritus is what isopods feed on, and it has a more acidic pH. When organic matter decays, H ions are produced. Therefore, acid is added to the dirt. By and large, the sourness bound for works is no lower than about 4.5 to 5.6 on the pH graduated table. The vapor force per unit area of a liquid refers to the thought that, in a closed container, vaporization will go on until equilibrium is reached. The vapor force per unit area of HCl and H₂O are about equal (20 mmHg at room temperature, 22 C) , and the vapor force per unit area of KOH for a 45 % solution is about 2 mmHg.

The intent of this experiment was to utilize pillbugs to analyze carnal behaviours and home ground penchants and to find whether this being prefers moist or dry home grounds, dark or light home grounds, and acidic or acerb environments. With cognition of isopods and pillbugs, it was hypothesized that the pillbugs would pass more clip near the moist filter paper because of their demand for high humidness in order to take a breath. Given that pillbugs live under stones and provender on disintegrating beings, which release acid into the dirt, it was besides hypothesized that they would prefer the dark instead than light conditions and the acidic over the acerb environment.

Materials and Methods

Water

Pipet

Filter Paper (2 pieces)

Choice Chamber

Scissorss

Soft Brush

10 Pill Bugs

Stopwatch

To detect pill bugs and their penchant moist versus dry conditions, a pick chamber, dwelling of two petri dishes connected to one another, was obtained and lined with filter paper. Two pieces of filter paper were cut to suit the Chamberss. One was so moistened, utilizing a pipette, with a few beads of H₂O. The 2nd piece of round filter paper was left dry. The moistened filter paper was placed at the underside of one chamber, chamber 1, and the dry filter paper was placed at the underside of the other, chamber 2. Then, utilizing a soft coppice, ten pill bugs were obtained from the stock of pill bugs, and so placed into the Chamberss. Besides utilizing a soft coppice, five pill bugs were placed in the dry chamber while the staying five were placed in the damp chamber and the Chamberss were closed. This pillbug count for each chamber was so recorded for clip zero proceedings. Using the stop watch to track clip, the count of pill bugs on each side of the pick

chamber was so recorded every 30 seconds for 10 proceedings, and continued even when some may no longer have been traveling or were all on one side. Notes were taken on the actions and interactions of the pill bugs throughout the 10 infinitesimal period. Once 10 proceedings had elapsed, the pill bugs were returned to the stock civilization.

Black Paper

White Filter Paper

Choice Chamber

10 Pill Bugs

Soft Brush

Scissorss

Stopwatch

To find the penchant of pill bugs between light and dark home grounds and conditions, a pick chamber with two linking petri dishes was lined with two different types of paper. One piece of normal filter paper and one piece of black paper were both cut to suit the Chamberss. Next, the underside of the interior of one dish, chamber 1, was covered with the unchanged, white filter paper and the other dish, chamber 2, was lined with the black paper. Then, utilizing a soft coppice, ten pill bugs were obtained from the pill bug stock civilization, five of which were placed in the black-paper lined chamber and the staying five were placed in the white paper lined chamber. The pick

chamber was so closed. The initial pill bug count, 5 in each chamber was so recorded in the tabular array. For a period of 10 proceedings, utilizing a stop watch to track clip, the count of the pill bugs on each side of the pick chamber was recorded every 30 seconds. In add-on, notes about the interactions of the pill bugs were taken throughout the 10 infinitesimal period. The count continued to be taken, irrespective of the deficiency of motion from the pill bugs or the concentration of all 10s in one chamber. After the 10 proceedings had elapsed, the pill bugs were returned to the stock civilization.

White Filter Paper (2 pieces)

0. 1 M HCl (Hydrochloric Acid)

0. 1 M KOH (Potassium Hydroxide)

Pipets (1 or 2)

Filter Paper (3 Pieces)

3 - Choice Chamber

10 Pill Bugs

Scissorss

Stopwatch

To find and see the penchant of pill bugs in footings of basic and acidic conditions, a 3-choice chamber was set up. Three pieces of filter paper were

cut to suit the Chamberss. Using a pipette, about four beads of 0. 1 M HCl were placed in a round form about the paper. Another piece of filter paper was sprinkled with 0. 1 M KOH in the same mode as was done with the hydrochloric acid. The HCl and KOH were applied to the filter paper in such a manner that the paper was non drenched in the chemical. One chamber, the one connected to two other Chamberss was lined with an unchanged piece of filter paper. One of the two staying Chamberss, chamber 1, was lined at the underside (inside underside) with the acidic filter paper and the staying chamber, chamber 3, was lined at the underside with the basic filter paper. Using a soft coppice, the 10 pill bugs were all removed from the stock civilization and placed in chamber 2, the in-between chamber consisting of the unchanged paper. The Chamberss were so covered and the pill bug count was recorded in the tabular array for the initial clip of 0 proceedings. For the following 10 proceedings, the count of pill bugs in each of the three Chamberss was recorded every 30 proceedings. The informations continued to be collected even when they were no longer traveling sides or were all on one side. After the 10 proceedings had elapsed, the 10 pill bugs were returned to the stock civilization.

Consequences

Table 1: Number of Pillbugs in Wet vs. Dry Chambers at Various Times

Time

(min.)

Number in Wet Chamber

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Number in Dry Chamber

Other Notes

0

5

5

Get down traveling immediately

0.5

2

8

Large figure displacements together to one side

1

1

9

One more babe follows

1.5

3

7

Contending between two larger isopods

2

5

5

Even out once more

2. 5

5

5

Move about but come back to even ; one non traveling

3

6

4

More to wet chamber

3. 5

4

6

Back to Dry Chamber

4

5

5

Crawling on bottom of paper

4. 5

4

6

Contending to acquire from one side to another

5

3

7

Large pillbug still non traveling

5. 5

6

4

Other pillbugs begin garnering around non-moving pillbug

6

7

3

Pillbugs piled on top of one another

6.5

5

5

Pillbug begins to travel once more

7

4

6

More to Dry Chamber

7.5

5

5

Back at even

8

6

4

Continual switch from chamber to chamber

8.5

7

3

Get down garnering at wet chamber

9

9

1

More join wet chamber

9.5

7

3

Crowded, a few spell to dry chamber

10

9

1

Tax return to wet chamber

Table 2: Number of Pillbugs in Lighter vs. Darker Colored Chambers at Various Times

Time

(min.)

Number in Light

Chamber

Number in Dark Chamber

Other Notes

0

5

5

Get down traveling immediately

0.5

3

7

Move to dark side

1

2

8

More to dark side

1.5

2

8

Remain, no overall motion

2

2

8

No overall motion

2.5

3

7

Get down traveling to white side

3

3

7

No overall motion

3. 5

4

6

Traveling to lighter side

4

2

8

Move to dark side

4. 5

5

5

Equalize once more

5

3

7

Contending to acquire to dark side

5.5

5

5

Equalize once more

6

4

6

More to Dark side

6.5

7

3

Stacking up to acquire to lighter side

7

7

3

No overall motion

7.5

8

2

More in lighter side

8

9

1

More in lighter side

8.5

7

3

Move to dark side

9

5

5

Equalize once more

9.5

3

7

Move to darker side

10

4

6

Young follows grownup to other side

Table 3: Number of Pillbugs in Neutral, Acidic and Basic Chambers at Various Times

Time

(min.)

Number in Neutral Chamber (Control)

Number in Acidic Chamber

Number in Basic Chamber

Other Notes

0

10

0

0

Immediate Movement

0.5

2

5

3

Move to acidic

1

3

5

2

Stay around outside of chamber

1.5

6

2

2

Quickly out of acidic and into impersonal country

2

4

3

3

More to basic country

2.5

5

2

3

Away from acidic country

3

2

3

5

More easy traveling to basic country

3.5

2

1

7

Motion to basic chamber

4

4

0

6

Pillbugs all out of Acidic country

4.5

1

1

8

Most in Basic country

5

1

4

5

Some return to acidic chamber

5. 5

3

1

6

Slowly traveling out of Acidic chamber and into impersonal and basic
Chamberss

6

4

1

5

Out of basic and into impersonal

6. 5

3

1

6

Back into basic country, around outside of filter paper

7

3

1

6

No overall motion

7.5

4

0

6

All gone from acidic country

8

3

0

7

More to basic country

8.5

4

0

6

Small displacement

9

3

0

7

Reverse of displacement

9.5

2

0

8

More to basic country more easy than earlier trial

10

1

0

9

More to basic country

Figure 1: Fluctuation in Number of Pillbugs in Wet and Dry Chambers

Figure 2: Fluctuation in Number of Pillbugs in Lighter and Darker - Colored Chambers

Figure 3: Fluctuation in Number of Pillbugs in Acidic, Neutral and Basic Chambers

Discussion

Table 4: Average Number of Pillbugs in Wet vs. in Dry Chambers

Time

(min.)

Number in Wet Chamber

Number in Dry Chamber

Average # of Pill Bugs in Wet

Average # of Pill Bugs in Dry

0

5

5

0.5

2

8

1

1

9

1.5

3

7

2

5

5

2.5

5

5

3

6

4

3.5

4

6

4

5

5

4.5

4

6

5

3

7

5.5

6

4

6

7

3

6.5

5

5

7

4

6

7.5

5

5

8

6

4

8.5

7

3

9

9

1

9.5

7

3

10

9

1

Entire # of Pill bugs

108

102

5.143

4.857

Table 5: Average Number of Pillbugs in Lighter vs. Darker-Colored Chambers

Time

(min.)

Number in Light

Chamber

Number in Dark Chamber

Average # of Pill Bugs in White (Light)

Average # of Pill Bugs in Dark

0

5

5

0.5

3

7

1

2

8

1.5

2

8

2

2

8

2.5

3

7

3

3

7

3.5

4

6

4

2

8

4.5

5

5

5

3

7

5.5

5

5

6

4

6

6.5

7

3

7

7

3

7.5

8

2

8

9

1

8.5

7

3

9

5

5

9.5

3

7

10

4

6

Entire # of Pill Bugs

93

117

4. 429

5. 571

Table 6: Average Number of Pillbugs in Neutral, Acidic and Basic Chambers

Time

(min.)

Number in Neutral

Chamber

Number in Acidic Chamber

Number in Basic Chamber

Average # of Pill Bugs in Neutral Chamber

Average # of Pill Bugs in Acidic Chamber

Average # of Pill Bugs in Basic Chamber

0

10

0

0

0.5

2

5

3

1

3

5

2

1.5

6

2

2

2

4

3

3

2.5

5

2

3

3

2

3

5

3.5

2

1

7

4

4

0

6

4.5

1

1

8

5

1

4

5

5.5

3

1

6

6

4

1

5

6.5

3

1

6

7

3

1

6

7.5

4

0

6

8

3

0

7

8.5

4

0

6

9

3

0

7

9.5

2

0

8

10

1

0

9

Entire # of Pill Bugs

70

30

110

3. 33

1. 429

5. 238

Figure 4: Comparison of Average Number of Pillbugs in Wet Chamber vs. in Dry Chamber

Figure 5: Comparison of Average Number of Pillbugs in Lighter-colored and Dark-colored Paper

Figure 6: Comparison of Average Number of Pillbugs in Acidic, Neutral and Basic Chambers

It was hypothesized that the pillbugs, given that they possess gills for respiration, and that they live where there is non a batch of visible radiation (under stones and logs) , they would prefer the moist chamber over the dry chamber and the dark chamber over the light chamber. Knowing that pillbugs feed off of disintegrating organic stuff, and the procedure of decay increases the dirt sourness, it was hypothesized that the pillbugs would prefer the acidic chamber (the 1 with HCl) , over the acerb (with KOH) and impersonal Chamberss. The information collected supports the hypothesis. The average figure of pill bugs in each chamber was calculated by numbering the pillbug count for all 21 times in one chamber and so making

the same for the following chamber and so splitting the two sums by the entire figure of pillbugs counted. This figure was 210 in each instance. As evidenced by Table 4 and Figure 4, the average figure of pillbugs in the moist chamber over 10 proceedings was about 5.143, and the average figure of pillbugs in the dry chamber over 10 proceedings was about 4.857. The higher norm of the moist chamber over the dry chamber shows taxis toward the stimulation (wet) .

The information collected besides supported the 2nd portion of what was hypothesized. The average figure of pillbugs in the chamber with light paper was about 4.429. Table 5 and Figure 5 show the average figure of pillbugs in the dark chamber to be approximately 5.571. The consequences and the known home grounds of pillbugs are consistent with one another.

The information collected in portion three of the experiment did not back up what was hypothesized. Table 6 and Figure 6 show that the basic environment (one with beads of KOH) was really preferred over a impersonal environment and the acidic environment (one with beads of HCl) by the pillbugs. The average figure of pillbugs in the impersonal environment was about 3.33, for the acidic environment the mean was about 1.429 and for the acerb environment the mean was approximately 5.238. It ' s possible the account for these consequences is the vapor force per unit area of the Hydrochloric acid being higher than that of the Sodium Hydroxide. Irritation caused by HCL zaping rapidly and acquiring into the pillbugs ' gills would explicate the deficiency of clip spent in the chamber with the HCl on the filter paper. The deficiency of wet on the field filter paper could explicate the deficiency of clip spent in the impersonal chamber. The <https://assignbuster.com/animal-behavior-pillbugs-and-their-preferences-essay/>

pillbugs ' aerial would feel any chemical or something like it, and they would be attracted to that chamber. Agnostic behaviour was exhibited by the pillbugs inside the pick Chamberss. Contending between the pillbugs represents agnostic behaviour. The consequences of the experiment would non be affected by mistakes in numeration or other human mistakes.

The informations collected from the experiment supported two tierces of what was hypothesized. The pillbugs ' penchants for dark and moist environments over light and dry environments were supported by the consequences. However, the consequences suggest that pillbugs penchant is for the more acerb environments over the environments that are impersonal or acidic.

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