GCSE Biology B (Twenty First Century Science)

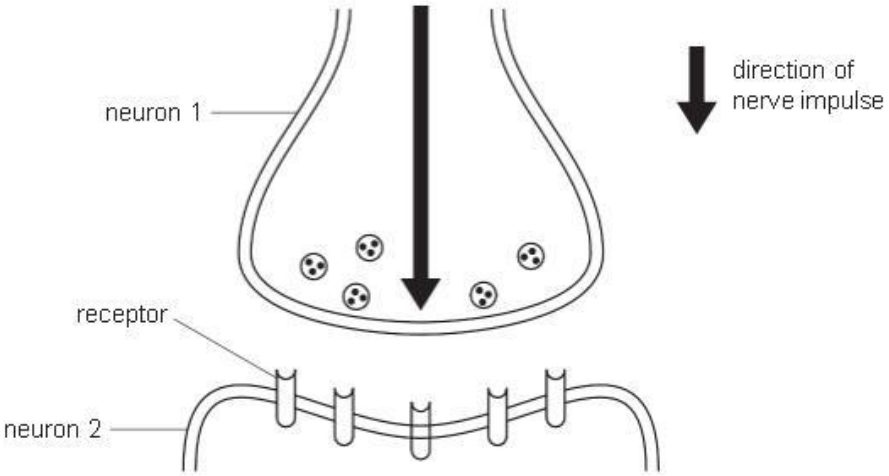
J257/02 Breadth in Biology (Foundation)

Question Set 2

1 Insecticides called neonics are widely used by farmers.

Neonics kill insect pests that live on crop plants.

(a) Neonics block receptors in synapses in the nervous system of an insect. This stops the transmission of a nerve impulse across the synapse. The diagram shows these receptors in a synapse.



Explain how neonics blocking receptors in a synapse stops the transmission of a nerve impulse across the synapse.

Molecules of neurotransmitter diffuse across the synapse and are detected by receptors. However, the receptors are blocked by neonics so there is no stimulation of neurone 2. (neutransmitters cannot bind)

(b) Explain why a farmer would want to use neonics to kill insects that live on their crops. **[3]**

To protect them from pathogens and damage caused by insects.

(c) One farmer grows a crop called oilseed rape. **[2]**

Honey bees feed on the oilseed rape, as shown in the food chain in **Fig. 1.1**.

The measurements below the food chain show the amount of biomass in each trophic level.

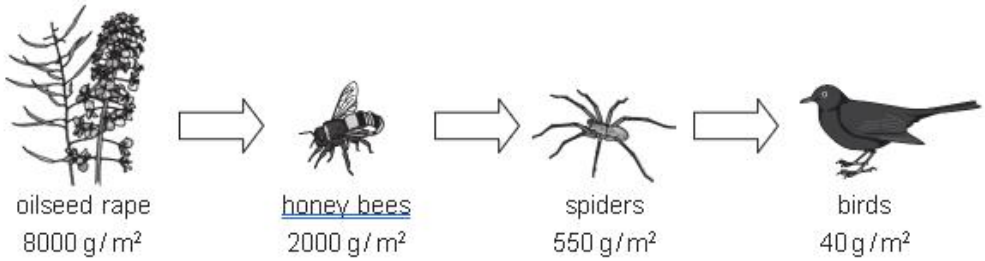


Fig. 1.1

(i) A food chain is one way of showing the feeding relationships in this ecosystem. A pyramid of biomass is another way.

Complete the pyramid of biomass for this ecosystem.

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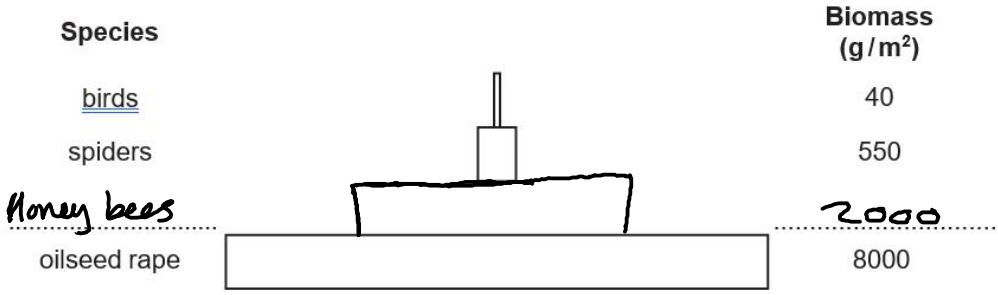

[2]

(ii) Calculate the efficiency of biomass transfer from the **oilseed rape** to the **honey bees**.

Give your answer as a percentage.

$\frac{2000}{8000} \times 100 = 25\%$

Efficiency = 25 % **[2]**

(d) Research studies have suggested that use of neonics on crops can cause honey bee populations to decrease.

Other studies have linked neonics to decreases in bird populations.

(i) To try to protect honey bees, the European Union banned the use of neonics on flowering crops.

Suggest why the ban applied to **flowering** crops.

Bees are pollinators so are likely to visit flowering crops. **[1]**

(ii) Write down **two** ways in which use of neonics could have caused a decrease in the numbers of birds.

Caused the killing of bees so less food for birds.
Also neonic would have passed up the food chain. **[2]**

(iii) Do you support the continued use of neonics on flowering crops? Justify your answer.

Yes, because we need to protect our crops from pathogens so that farmers livelihoods are protected and to ensure we have enough food to eat. **[3]**

Total Marks for Question Set 2: 15