Pecking at tasty larvae

If broiler chicks can peck at fly larvae, they display more natural foraging behaviour, are less anxious and stay healthier. And if the protein-rich larvae are bred on surplus manure, they also form a sustainable feed.

TEXT ANNE VAN KESSEL **PHOTO** ANP

Broiler chicks that are fed on live fly larvae move around more, and that improves their wellbeing, shows research by Allyson Ipema, a PhD student in the Adaptation Physiology chair group at Wageningen. 'Insects have been seen for a while as an interesting potential food source for chickens because they are a good source of fats and proteins. Only we didn't yet know so much about the effect of that, especially not in relation to animal welfare,' says Ipema.

So she used a grant from the Dutch Research Council (NWO) and investments by livestock feed manufacturer ForFarmers, chicken breeding company HatchTech and insect breeding company Bestico to study the health and behaviour of broiler chicks fed on the living larvae of the black soldier fly, as a supplement to their usual diet.

Fast-growing broiler chicks tend to get too little exercise and are often left in dirty bedding, which causes leg diseases. 'That might change if they can move around more, we thought,' Ipema explains.

'I started every day by going to the refrigerator, where I measured out the right quantity of larvae,' she says. She then brought the larvae to the barn for the first feeding time of the day. In between feeding times, she observed the behaviour of the chicks and monitored their health, by weighing them for instance.

SCRATCHING AND PECKING

The chicks did indeed become more mobile. The more often they were given larvae, the more active they became. 'They scratched and pecked around to find the larvae. If we gave them a little bit of feed seven times, instead of giving them more feed four times, they remained more active.' She found there was a maximum proportion of larvae in the feed for the chicks' health. 'If the insects made up 10 per cent of their diet, and they got this in two big portions, some of the chicks didn't grow as well. We think that was because they got a lot of fat and protein in one go, and therefore ate less of their usual food. Another explanation could be that the other nutrients don't then get absorbed as well in the intestines.'

In the study, which was published in *Applied Animal Behaviour Science*, Ipema noticed that the legs of the chicks fed on larvae were healthier than those of the control group. 'Fewer of them were lame, and fewer had skin infections on their heels.' Ipema thinks that is because the chicks move around more, which strengthens their legs and means they spend less time in contact with dirty bedding. It could also be because the chicks turn over the bedding in their search for insects, keeping it loose and aerated.

> **'The animals are displaying more natural foraging behaviour'**

NATURAL BEHAVIOUR

In a second study, some of the chicks were offered the larvae in a transparent tube with holes drilled into it. 'Those animals displayed even more natural behaviour. Getting the larvae out of the tube kept them occupied for most of the day. That closely resembles the natural context in which chickens might have to get insects out of a tree, for example.'

The chicks also exhibited less anxiety than the control group, showed one measurement. 'That's another indication of improved animal welfare,' says Ipema.

In this study, published in *Nature Scientific Reports*, she did not see the same improvement in leg health. 'That might be because in this study we wanted to simulate the conditions in commercial chick hatcheries, so we'd put more chicks together and they didn't have as much freedom to move around. This makes it clear that more research is needed before we can apply the finding on a commercial scale, where the chick density is often even higher.'

Nevertheless, Ipema thinks larvae can be a good addition to the diet of chicks in commercial barns. 'Those chicks often have nothing to do for six weeks. That changes when they go in search of larvae, which improves their welfare.'

At present the EU does not permit the addition of animal products to poultry feed, due to the risk of diseases. Insect protein or dead larvae cannot therefore be fed to chicks. 'You can feed them live larvae, because the legislation does not cover that.'

The PhD student has already had a few responses to her research. 'Amongst others, there was a farmer in Texas who was eager to try this.' She herself is going to research whether larvae could also be a sustainable source of feed for pigs, and whether that would improve the pigs' welfare too. ■

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CIRCULAR NUTRITION

Global demand for chicken is rising with the growth of the world population. This makes the quest for sustainable chickenfeed urgent. Larvae are potentially a sustainable and circular food source, Ipema and her colleagues believe. This is mainly because larvae are protein-rich and can be bred on manure, so that surplus manure can be converted into valuable protein. This is not yet allowed in the EU, partly because research needs to be done first to check that it doesn't raise the risk of diseases. Fellow researchers Alejandro Parodi and Imke de Boer are already investigating whether using larvae as a circular food source offers environmental benefits as well.