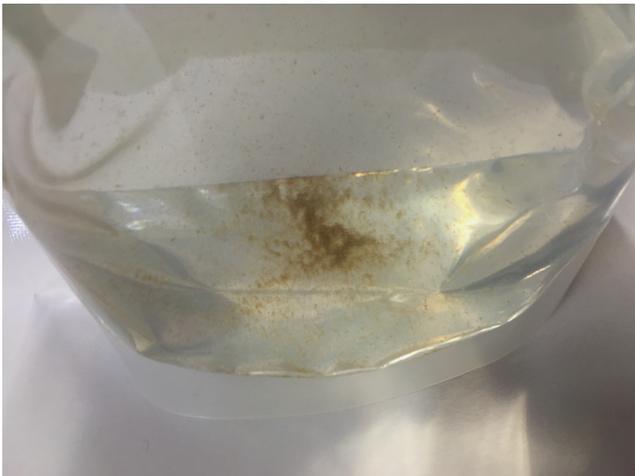


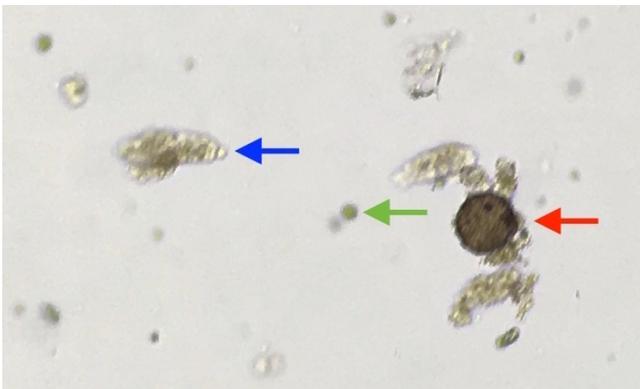
## Dead Copepods, or Something Else?

We all know that sunken feeling—after seeing the beautifully photographed copepods on the website, you place your order, eagerly anticipating its arrival. When it's finally at your doorstep, you tear through the wrapping and uncover your carefully packaged bag of copepods in all its shimmer. But something seems off. You notice specks settling at the bottom of the bag and you begin to fret that your copepods have arrived dead (**FIGURE 1**).

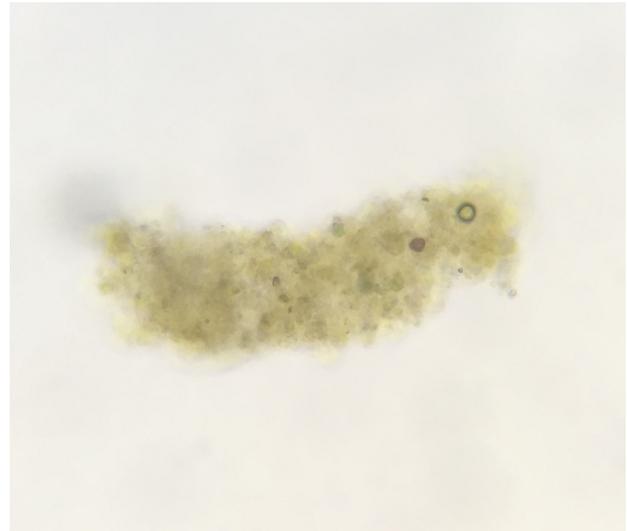


**FIGURE 1: Sediment specks at bottom of a bag of Apocalypse Pods prior to shipping.** These specks are normal and can appear in any live copepod product.

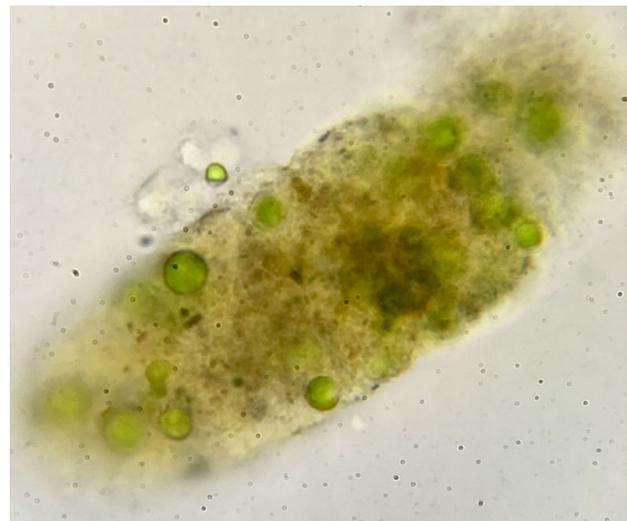
Rest assured, because there is more than meets the eye. In this white paper, we explore what actually makes up the specks you might see settling on the bottom of a bag of copepods. The specks are made up of three things: detritus, phytoplankton, and copepod eggs (**FIGURE 2**). Let's take a detailed view of each component in **FIGURES 3-5**.



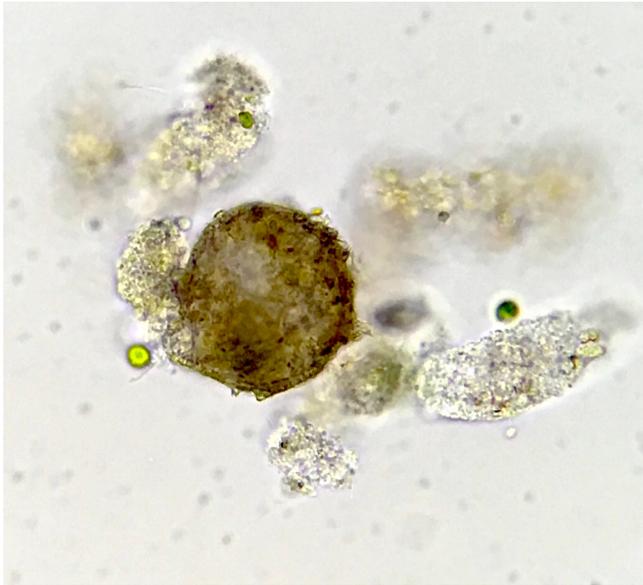
**FIGURE 2: Three main components making up the sediment specks.** Magnified view is cropped from 40X. From left to right, arrows point to detritus (blue), phytoplankton (green), and copepod egg (red). This sample is representative of the entire sediment.



**FIGURE 3: First component, detritus.** Magnified view is cropped from 100X. Some traces of nutritious phytoplankton (*Nannochloropsis gaditana* and *Isochrysis galbana*) can be seen dispersed throughout.



**FIGURE 4: Second component, phytoplankton (lodged into detritus).** Magnified view of nutritious phytoplankton (*N. gaditana*) and detritus is cropped from 100X. Phytoplankton includes both isolated and flocculated forms. The phytoplankton-infused detritus provides an alternative food source for copepods in addition to the phytoplankton suspended in solution.



**FIGURE 5: Third component, copepod egg.** Magnified view of egg (*Apocyclops panamensis*) with surrounding detritus and phytoplankton (*N. gaditana*) is cropped from 100X. Eggs are able to hatch and contribute to the overall population in each product bag.

Detritus, or waste, is primarily produced by copepods during their growth cycle, so traces of it are expected if the copepods are alive and well. But as we can see in **FIGURES 3 and 4**, detritus can often be mingled with phytoplankton flocculates. Copepods feed on detritus (Tackx et al., 1995), and even more-so when it is enriched with other microbiota (Heinle et al., 1977). Thus, in combination with the suspended phytoplankton that AlgaeBarn adds to each product bag, the phytoplankton-infused detritus can serve as an alternative source of food for copepods during shipping and storage.

Because each bag of product contains copepods from every part of the growth cycle, it would be unsurprising to find copepod eggs scattered among the sediment (**FIGURE 5**). These eggs are able to hatch and further contribute to the population within the product bag.

In short, the sediment specks are not what some might believe as dead copepods, but are instead components that indicate normal copepod functioning and that benefit the product overall. Since AlgaeBarn harvests and packages each container of copepods by hand, it is normal to expect varying amounts of sediment in each. But rest assured, these sediment will always contain a concoction of nutrients and eggs to ensure that the copepods not only ship well but store well, too.

## References

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- 2 Tackx, M., Irigoien, X., Daro, N., Castel, J., Zhu, L., Zhang, X., & Nijls, J. (1995). Copepod feeding in the Westerschelde and the Gironde. *Hydrobiologia*, 311, 71-83.

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