

Does Transport Duration Of Shrimp Post Larvae Adversely Affect Culture Performance?



L. Vannamei PL imported from USA, Austria and Germany stocked, cultured & compared at an inland, Biofloc-based shrimp farm in Germany*

DBU-funded Project: “Developing solutions for sustainable, Nitrogen-efficient indoor shrimp production in compliance with animal welfare and based on Biofloc technology”



Background

At the project start in 11/2019 all PL were imported from the USA. Transport duration of more than 24h and poor transport conditions may impact the performance of shrimp during culture. One of the aims was to reveal a theoretical influence imposed by PL origin.

Approach

In 2020 “Damm Aquakultur” stocked 3 batches of *L. vannamei* (PL11-12) from 3 origins in parallel:

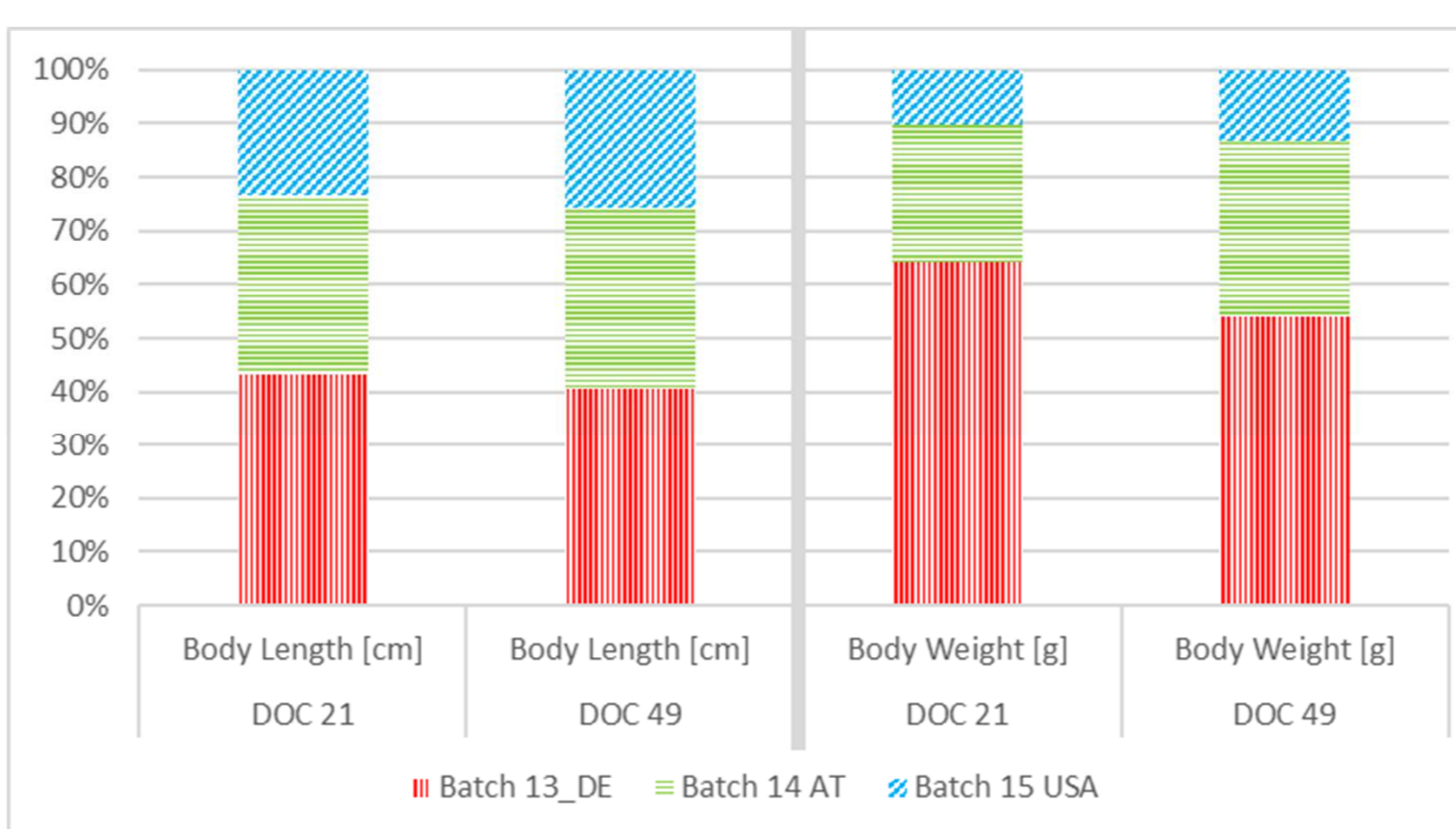
PL origin	Transport vehicle	Transport duration [h]	Transport temperature [°]
Germany (DE)	car	ca. 4	20 - 24
Austria (AT)	car	ca. 8	20 - 24
USA (US)	plane + car	ca. 36	18 - 20

Due to continued pandemic-related shortage of PL two of these batches were cultured much longer than planned. Unfortunately, a simultaneous stocking could not be repeated, but PL from these 3 countries could be stocked several times within the observation period of ca. 18 months.

Zootechnical data, such as mean body weight (MBW) and mean body length were determined at several days of culture. Other parameters (antenna length, dorsal and lateral width) were determined on harvested shrimp only. Monitoring included water quality parameters, not shown here. At three sampling dates during the culture period our cooperation partner examined the microbiome, its diversity and the relative abundances of bacteria phyla.

Results

- In 3 simultaneously stocked batches PL from Germany (DE) grew much faster compared to PL from Austria (AT), followed by PL from USA (US)



Relations in body length and body weight among PL from 3 sources, at DOC 21 and DOC 49 (DOC: Day Of Culture) DE= Germany, red; AT= Austria, green, US= USA, blue)

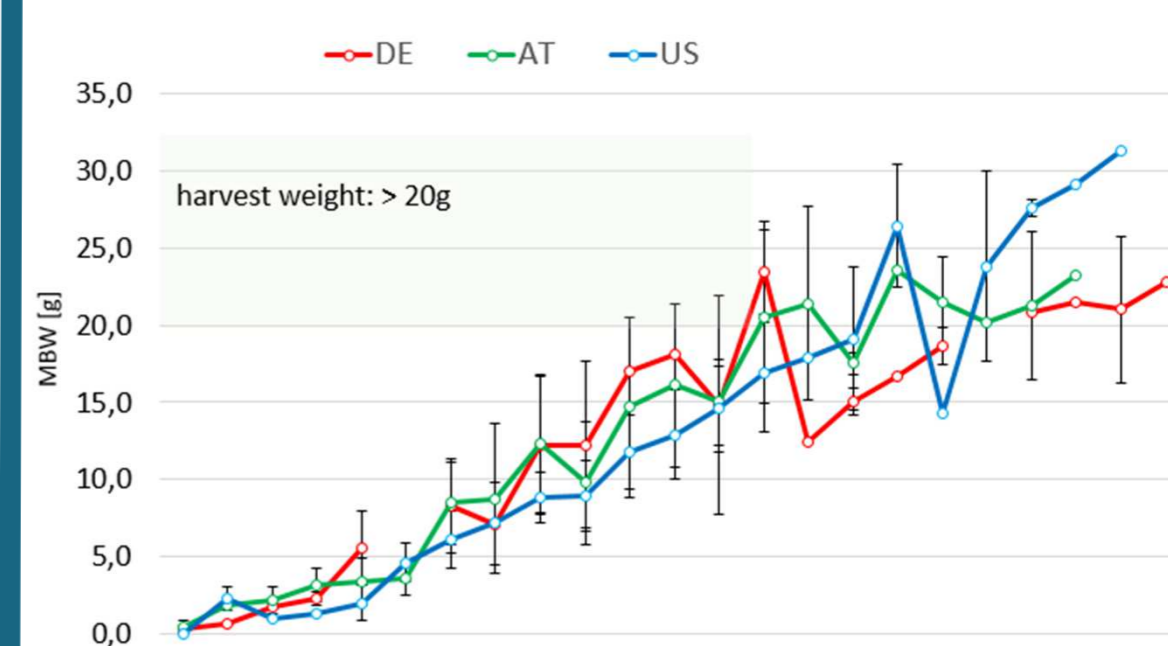
- Harvest was highest for PL from Germany (at DOC 116), but the difference in culture length did not allow direct comparison with the other 2 batches having been cultured for >200 days, thus associated with higher losses over time
- Comparing 3 to 7 batches per origin did reveal high variability in growth, independent of origin
- The microbiome differed at PL arrival and grew more diverse during culture, regardless of PL origin
- Members of Nitrospirota increased in biofilm on tank surface, observed in all sampled tanks

Conclusion and outlook

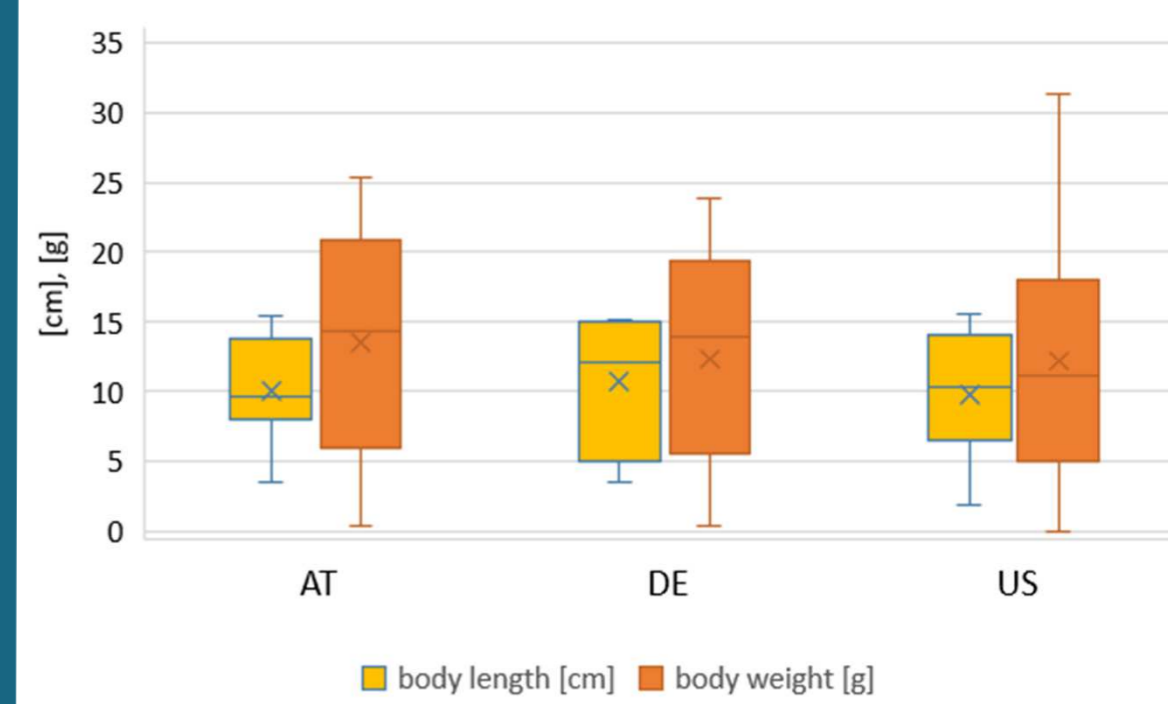
Zootechnical performance of *L. vannamei* cultures could not be clearly related to the country of origin. The hatchery, presumably the genetics employed, appear to be the more critical factor.

More R&D in cooperation with shrimp producers is desirable in support of efforts in breeding the ‘optimum’ shrimp for indoor farming.

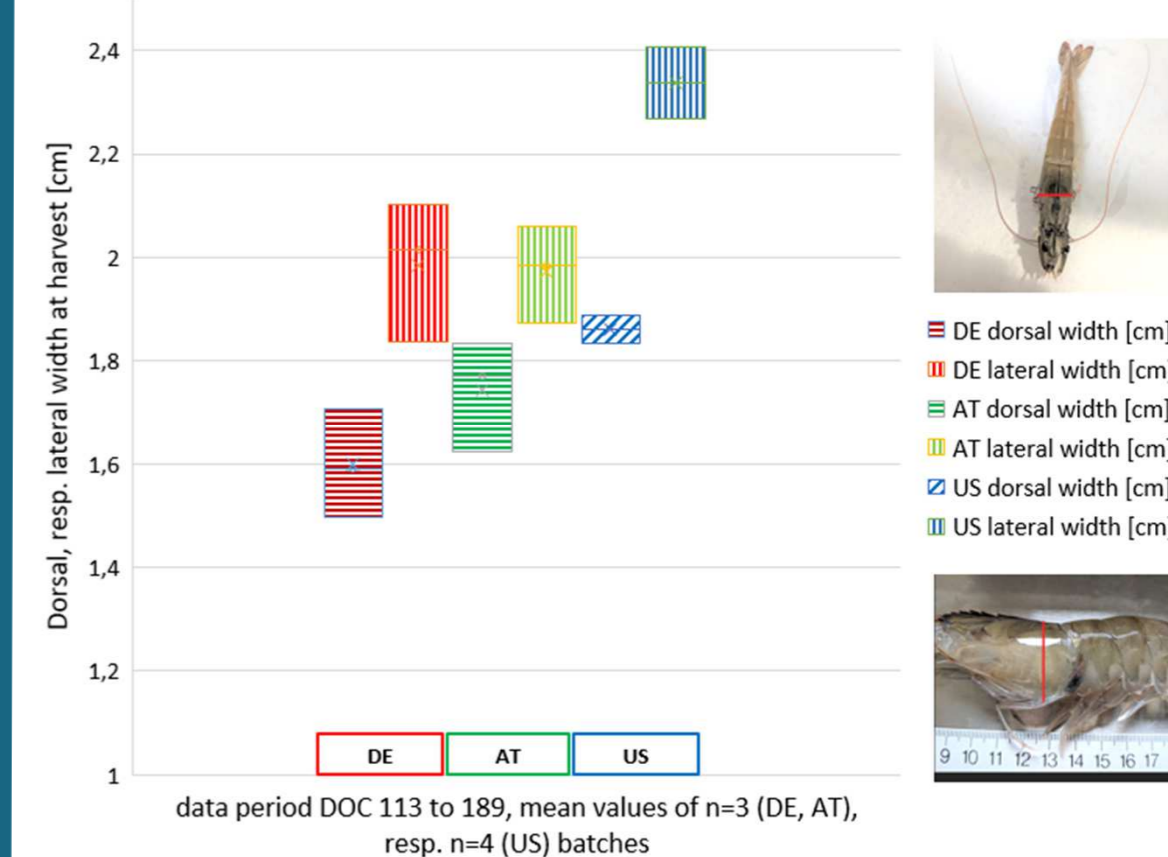
*Shrimp farm „Damm Aquakultur“: www.die-landgarnele.de



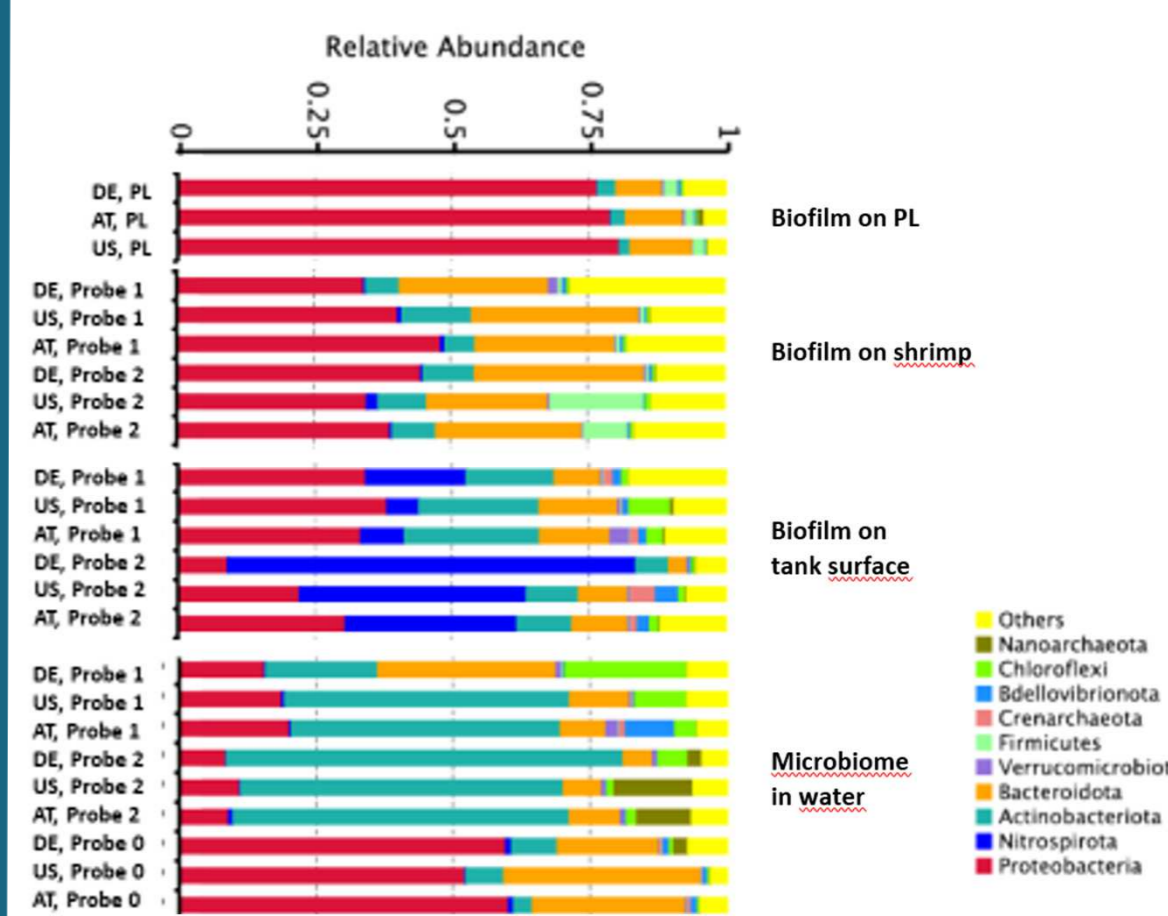
High variability in growth of shrimps of 3 origins: mean body weights [g] as average of several batches per origin: 3 batches DE= red; 4 batches AT= green, 7 batches US= blue



No difference in max. body length or body weight achieved in same culture length, only higher variability in body weight data of 7 batches from the USA



Dorsal and lateral width of carapace of harvested shrimp of different origin (DE= red; AT= green, US= blue)



Relative abundance of bacteria phyla in the microbiome:

- on PL of 3 origins (at DOC 1)
- on shrimp in grow-out phase (Probe 1= sample 1 at DOC 50, Probe 2= sample 2 at DOC 85)
- in culture water (Probe 0 at DOC 1)