

10.2 Nets inter calibration

10.2.1 Methods of the plankton nets inter calibration *Text by I. Prokopchuk and P.*

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Figures by I. Prokopchuk

In August 2013 on board of the Norwegian R/V “Johan Hjort” it was planned to conduct specialized work on inter calibration of plankton sampling gears used at the ecosystem cruises in the Barents Sea. Juday net (opening diameter 0.11 m², mesh size 180 µm) is used at PINRO and WP2 (opening diameter 0.25 m², mesh size 180 µm) is used at IMR as well as MOCNESS, a multiple opening/closing net and environmental sensing system for sampling zooplankton (Wiebe et al., 1976; 1985) (opening diameter 1 m², mesh size 180 µm). To make simultaneous vertical hauls Juday and WP2 nets were mounted on a frame previously made at IMR (Figure 10.2.1.1).

The inter calibration was conducted on 20 August 2013 in the fjord of the west part of Spitsbergen (78°07'N and 13°12'E) over depth 250 m. Sampling was started at 1 a.m. At first, an oceanography station with collecting water for nutrients and chlorophyll a, and phytoplankton sampling were carried out. Thereupon it was done the first set of plankton sampling by Juday and WP2 nets, vertical hauls from the bottom to the surface. There were conducted 10 replicates with hauling speed of 0.5 m/s and 10 replicates with the speed of 1.0 m/s. The second set of plankton sampling was started at noon and 10 replicates with hauling speed of 0.5 m/s and 10 replicates with the speed of 1.0 m/s were made. After each sampling set by Juday and WP2 nets, plankton was collected using MOCNESS at the layers bottom-100, 100-50, 50-25 and 25-0 m. In total 80 samples by Juday and WP2 nets and 8 samples by MOCNESS were collected. Preliminary samples processing on board of the R/V was conducted according to standard procedures accepted at IMR. All the samples were delivered to IMR at the end of the cruise.

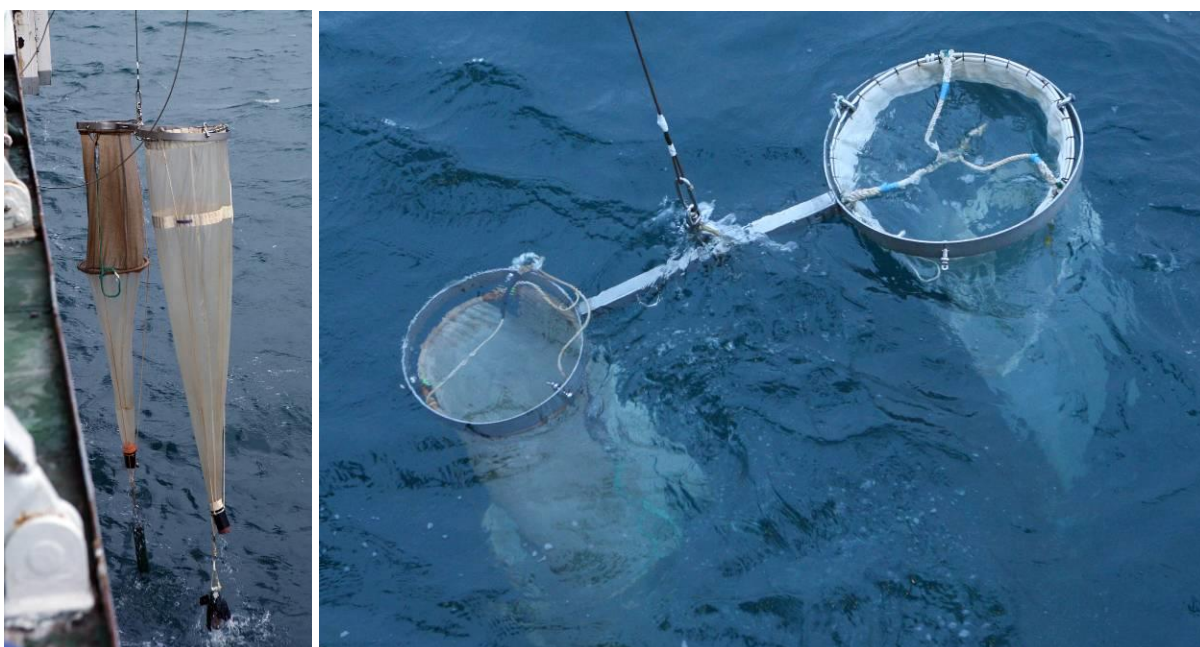


Figure 10.2.1.1 The frame with Juday and WP2 nets for simultaneous catch of plankton

10.2.2 Preliminary results of the inter calibration of Juday and WP2 nets

Text by I. Prokopchuk and V. Nesterova

Figures by I. Prokopchuk

In October 2013 species composition and plankton abundance of 20 plankton samples (10 pair samples) were analyzed. The samples were collected during inter-calibration of Juday and WP2 nets in August 2013 on board of RV “J. Hjort”. 10 samples were collected with the hauling speed $0.5 \text{ m} \cdot \text{s}^{-1}$ and 10 samples were collected with the speed $1.0 \text{ m} \cdot \text{s}^{-1}$.

Results of the inter calibration Juday and WP2 nets showed low variability between samples (Figure 10.2.2.1). The values of plankton biomass (dry weight, $\text{mg} \cdot \text{m}^{-3}$) by Juday and WP2 nets catches were very similar. Plankton biomass was 16 % higher by WP2 net catches, than by Juday net catches, and in some cases it was 9 % higher by Juday net catches. Biomass of plankton, sampled with the hauling speed of $1.0 \text{ m} \cdot \text{s}^{-1}$ (samples 11-15) was 36 % higher than that sampled with the speed of $0.5 \text{ m} \cdot \text{s}^{-1}$ (samples 1-5) by Juday net catches and 40 % higher by WP2 nets catches.

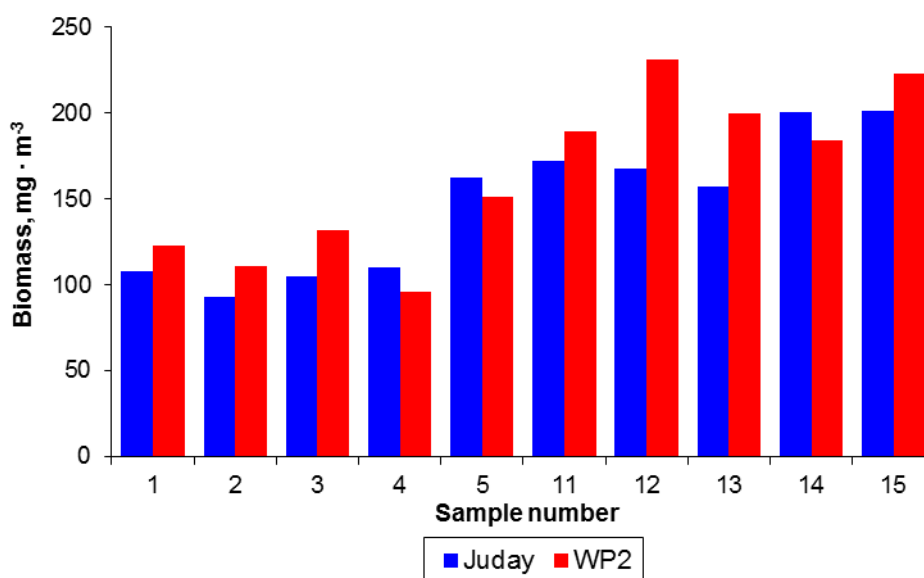


Figure 10.2.2.1 Plankton biomass (dry weight, $\text{mg} \cdot \text{m}^{-3}$) variability in the area of inter-calibration of Juday and WP2 nets. Samples 1-5 were collected with the speed $0.5 \text{ m} \cdot \text{s}^{-1}$ and samples 11-15 were collected with the speed $1.0 \text{ m} \cdot \text{s}^{-1}$

Total abundance of plankton substantially varied between samples, especially at the hauling speed $0.5 \text{ m} \cdot \text{s}^{-1}$ (Figure 10.2.2.2A). Plankton abundance in 4 of 5 pair samples collected at the speed $0.5 \text{ m} \cdot \text{s}^{-1}$ was higher by WP2 net catches. At the speed $1.0 \text{ m} \cdot \text{s}^{-1}$ plankton abundance in 3 of 5 pair samples was higher for Juday net catches, and in 2 pair samples abundance was almost equal (Figure 10.2.2.2A).

Copepods were dominant group of plankton in terms of abundance (Figure 10.2.2.2B). Their abundance varied between samples and comprised 61-88 % of total plankton abundance by Juday net catches and 40-83 % by WP2 net catches. Plankton abundance was higher by Juday net catches in 3 of 5 pair samples collected at the speed $0.5 \text{ m} \cdot \text{s}^{-1}$, and in 4 of 5 pair samples at the speed $1.0 \text{ m} \cdot \text{s}^{-1}$ (Figure 10.2.2.2B). The most numerous were small copepods of genus *Oithona* (mainly *Oithona similis*) (Figure 10.2.2.3). Their abundance was 48-73 % of the total copepods abundance by Juday net catches and 41-85 % by WP2 net catches. Three *Calanus* species (*C. glacialis*, *C. hyperboreus*, and *C. finmarchicus*) were presented in the samples, but the most numerous one was *C. finmarchicus* and dominated in plankton biomass. Its abundance varied from 7 to 28 % by Juday net catches and from 6 to 24 % by WP2 net catches. Abundance of *Pseudocalanus* sp. not exceeded 14 %.

In conclusion it is necessary to note, that in order to make proper analysis of the data and statistical calculations, processing all 80 samples (40 pair samples) is required. Presented preliminary results are based on analysis of 20 samples (10 pair samples). In order to reduce discrepancy of samples processing, all the samples should be processed by the same specialists.

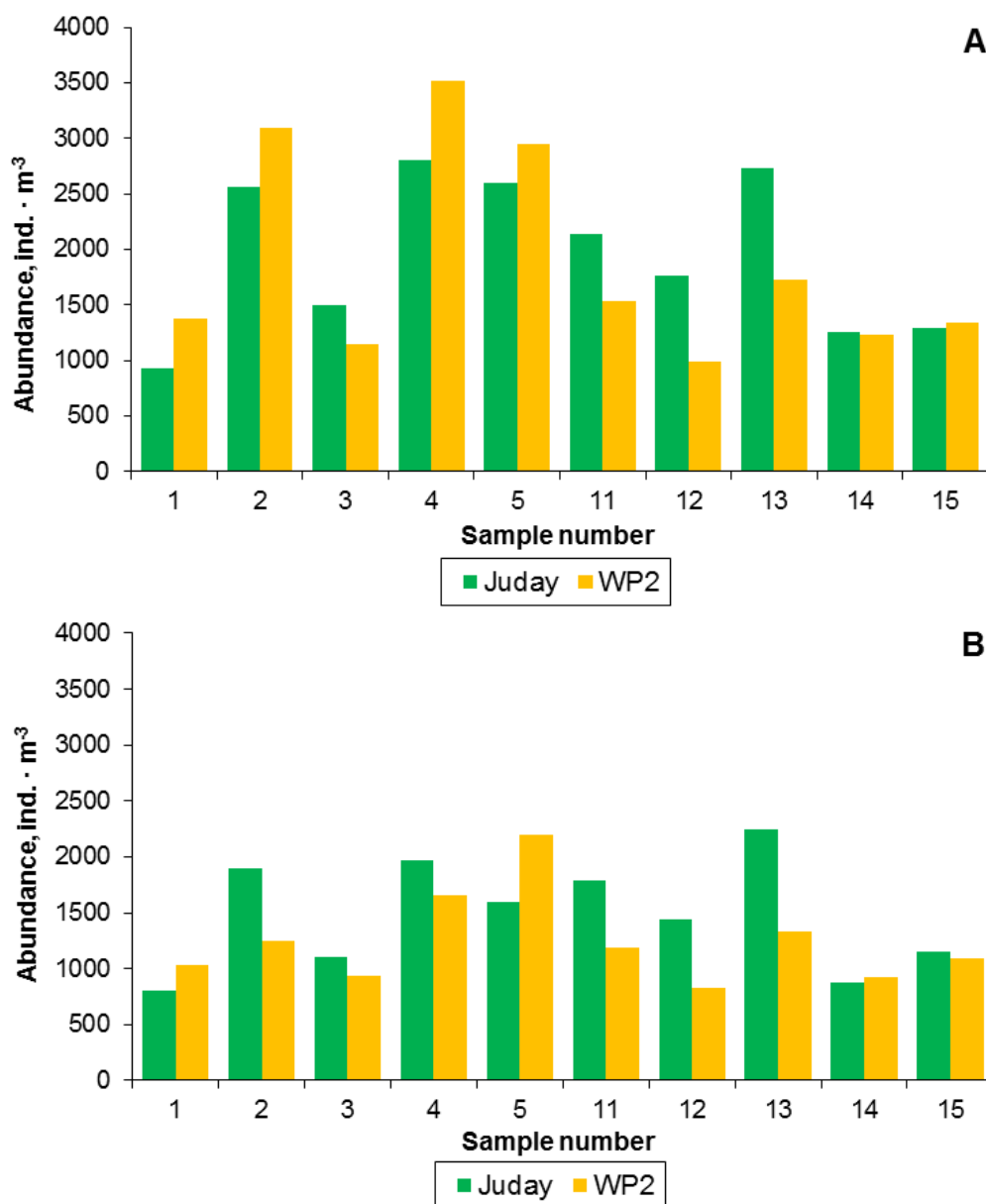


Figure 10.2.2.2 Total plankton abundance (A) and copepods abundance (B) (ind. · m⁻³) by Juday and WP2 nets catches

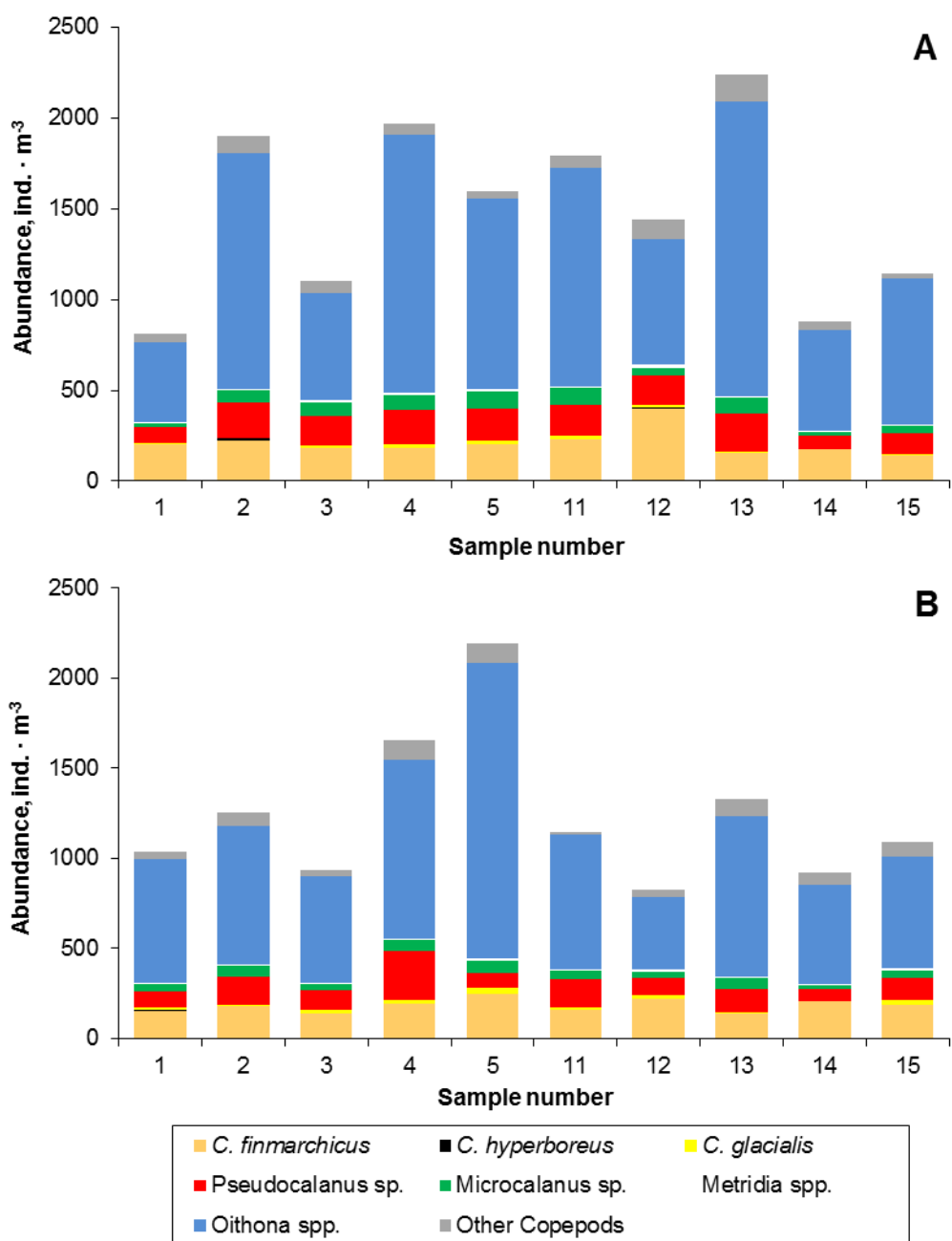


Figure 10.2.2.3 Copepods abundance (ind. · m⁻³) by Juday (A) and WP2 (B) nets catches