**SHORTER VERSION PHYCOCYANIN PROCEDURE**

**What phycocyanin values are of concern?**

Phycocyanin (PC) is a pigment found almost exclusively in cyanobacteria ensuring specificity in the results. Phycocyanin concentrations are a good substitute for cyanobacterial cell counts, particularly if large spatial areas are concerned or a rapid determination of the presence and density of cyanobacteria is needed.

* The phycocyanin probe (Cyclops 7), has a detection level of 2 µg/L. If a value >2 the presence of phycocyanin and cyanobacteria is confirmed.
* **Readings between 50 and 100 PC would suggest that the waterbody has a bloom of cyanobacteria**, but it is not known if cell counts of >70,000 cells/mL are present which is the limit for recreational use in Massachusetts. Further work is needed to confirm density of cyanobacteia present.

Phycocyanin will be measured using a Cyclops-7 probe (Turner Designs, Inc). The data will be stored using a DataBanks Datalogger (Turner Design, Inc). Readings will be collected by either wading into the water and immersing the probe to the depth desired or from a dock where the probe can be lowered to a maximum of 5 meters. A cyanobacteria sample should be collected for identification and counts.

**Before going in the field-Check or Charge battery**

Always start by charging the battery of the DataBank Datalogger. A full charge could take an hour. Attach the external power cable to the top of the DataBank (this cable has two ends, a round hole plug and a USB end). The cable is kept in the ‘color’ lab in the drawer marked PHYCOCYANIN SUPPLIES. The battery when charged should flash done and **pv.** If you’re taking readings and it say low in the upper right hand corner it means that the low level of fluorescence is being used. It is not an indication that the DataBank needs charging.

**Setup and Operation DataBank Datalogger**

After charging the battery, remove the power cable.

The DataBank (Figure 1) (Table 1) has 4 toggle switches. Press down for the functions listed across the top-power, store, recall, select and **hold** the toggle down to get the functions listed below-off, log, erase, #01. When the power is on pressing the power button will turn on and off the backlight too.

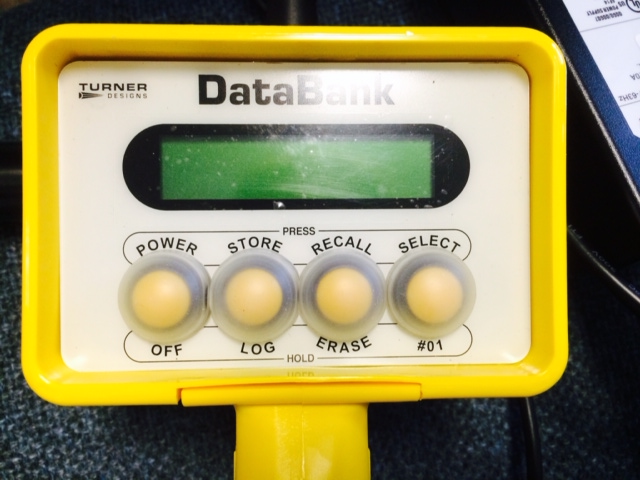
 Figure 1 DataBank

Table 1 Description of functions of DataBank buttons

|  |  |  |
| --- | --- | --- |
| Button | Press- <1 second | Hold> 1 second |
| Power | Turn DataBank on  also  If unit is in logging mode pressing power will stop logging | Turn DataBank off |
| Store | Stores current reading displayed | Starts ***logging mode*** when logging mode has begun the screen will display-**Logging Mode Entered** |
| Recall | Displays the last record stored  Pressing this button again will ‘decrement’ to the next record stored until the first record stored is reached then it will increment to the last record stored | Erases the last record stored  Display will show-***Caution about to clear***-which is followed by-***Cleared top record*** |
| Select | Selects a parameter group | Reverts to first parameter group |
|  |  |  |
|  |  |  |

After chargingbatter, remove the ShadeCap and attach the Secondary Solid Standard (a small tubular item that fits on the end of the probe) which is also kept in the Phycocyanin Supply drawer. The Solid Standard is pushed onto the end of the probe and then rotated until you feel the ‘indexing ball’ click into position (<http://www.turnerdesigns.com/t2/doc/instructions/998-6800.pdf>). Obtain the reading from the DataBank and record on the calibration sheet (folder marked Cyclops 7 in drawer) along with time and air temperature. Readings should be around 90 µg/L. There will be variation, but a trend downwards overtime would indicate time to replace the solid standard and/or recalibrate.

**In the field-on land**

1. Bring out to field-attach cable to the DataBank making sure that the pins align with the proper holes;
2. Attach Cyclops 7 (the actual probe for making the phycocyanin measurements to the other end of the cable. Make sure the slotted plastic shade cap is attached (Figure 2).
3. Get GPS reading of your location and record on field sheet included in sampling case

Figure 2: Cyclops 7 Probe with Shade Cap



**Field Procedure for Phycocyanin Measurements**

1. Take temperature of water using hand held thermometer, record on field sheet
2. Either walk into the water with the probe or lower probe from dock to obtain measurements
3. Wade into water to knee depth. Wait for the sediments to settle before beginning readings
4. Press power button -warm up is 5 sec;
5. Submerge the probe end to allow it to acclimate to the water temperature (~1 minute) before starting to record readings
6. Lower probe to depth desired for first reading (0.25 m represents the same as depth uses by MADPH in sample collection). A yellow tape marks this depth. (If there is a visible ‘algal scum’ the probe end could be lowered just below the surface). Position the probe so that the entire shade cap is immersed and an inch or more of the probe tip is in the water. Begin by pressing store and then press recall to obtain that reading and record on field sheet. The **time of the reading** must be recorded next to depth as well as the phycocyanin value. Then at this depth hit store three more times for a total of 4 readings at each depth. To observe these readings press recall. Each time recall is pressed the readings go to the previous one obtained.
7. If measurements are wanted at other depthsthe cable is marked with yellow tape at 0.25 meters, 0.5 and subsequent meters down to 5 m. Go to next depth and repeat step 6
8. When the readings are completed, obtain a grab sample for cyanobacteria identification and counts
9. If readings are being collected from other areas of the waterbody just swirl the probe gently in the water at the new location to clear any film, but if you go to another water body then DI water should be used for cleaning the probe lens.

**Power off the DataBank**

1. Hold down the power button for > 1 sec
2. Take off the shade cap, rinse it with DI water and wipe it off with clean rags;
3. Rinse the probe lens with DI water, **gently** blot with a clean cloth, if it’s really dirty bring it back to the lab and put it in soapy water for an hour or so and then rinse well with DI
4. Do a post calibration of the probe using the secondary solid standard and record.
5. After cleaning, return the probe and shade cover to the carrier case, coil the cable in loose coils in the carrier case.

Samples collected for identifications and counts should be kept in a cooler containing ice for transport back to Worcester where they should be refrigerated. Joan Beskenis or Art Johnson should be notified of their arrival.