

8-week monitoring of **microalgae** activity

Shellfish facility, coastal lagoon, Mediterranean sea, France

Methods

Monitoring of the activity of the microalgae *Dinophysis sp* over 8 weeks (mid-October to mid-December) by Microbia Environnement

- Bi-weekly sampling (1m depth, surface water)
- Direct analysis (3h)
- Estimation of toxic risk with a color-based scale
- Alarm threshold: 0.2 unit of activity

Toxic Risk	Unit of activity (OD _{450nm})
no risk	<0.02
low	0.02-0.2
moderate	0.2-0.4
high	0.4-0.6
very high	0.6-1

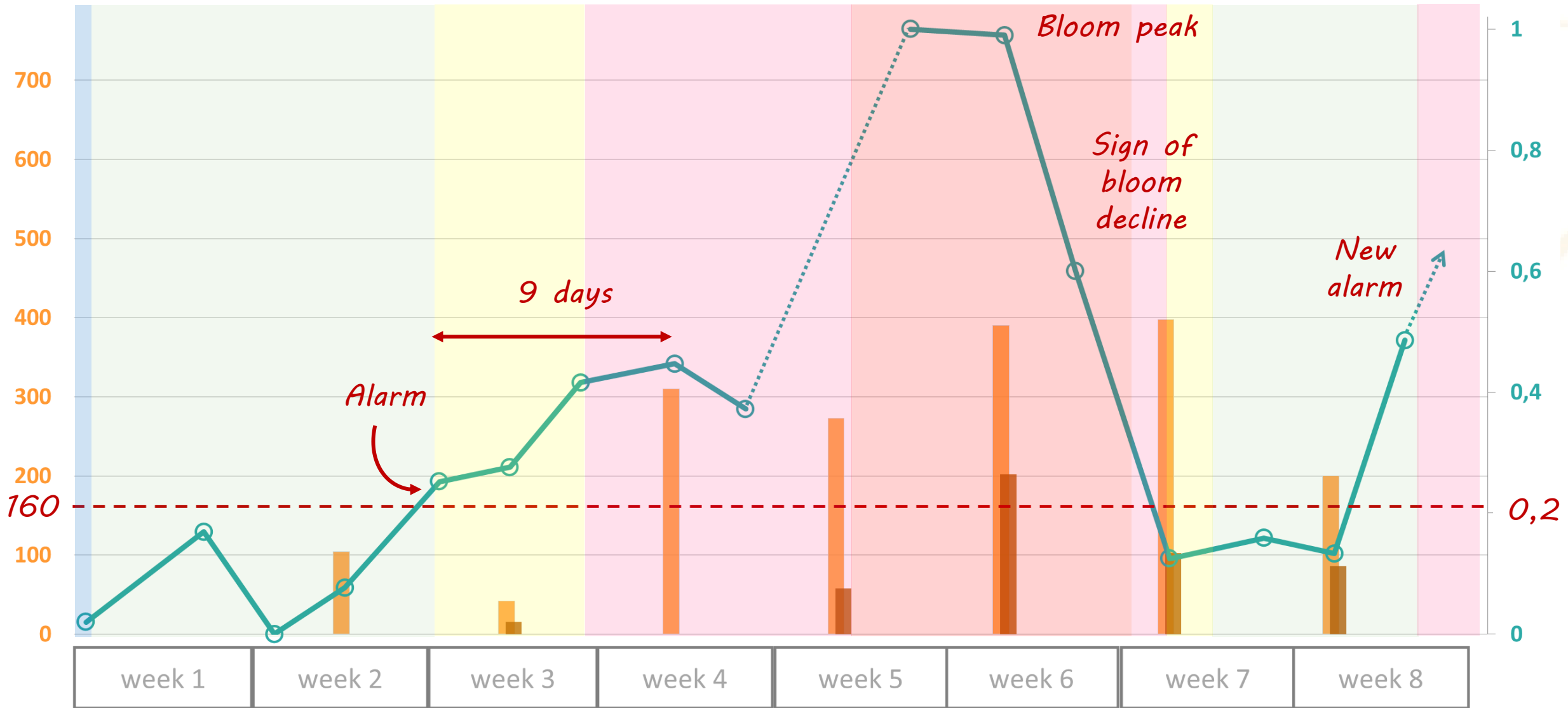
Analyses of toxin concentrations in mussels/oysters by an independent accredited laboratory

- Sampling for cell enumeration by microscopy: once per week > 3-day analyses: if positive > sampling for toxin analyses > Results given after 4 days
- Mussel: *Mytilus galloprovincialis*, Oyster: *Crassostrea gigas*
- Toxins: OA, DTXs, PTXs
- Threshold (for sales ban): 160µg/kg shellfish flesh

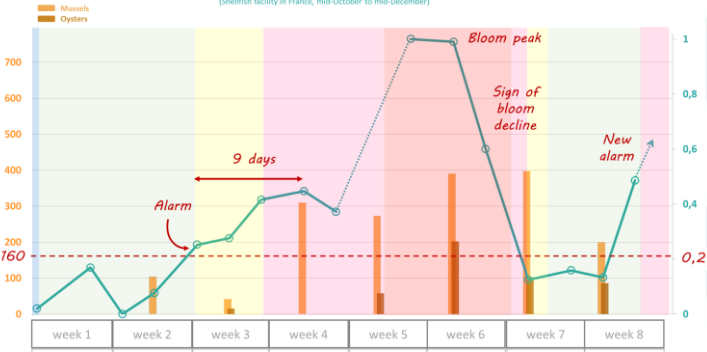
8-Week Monitoring of *Dinophysis* sp.

(Shellfish facility in France, mid-October to mid-December)

Mussels
Oysters



8-Week Monitoring of *Dinophysis* sp.
(Shellfish facility in France, mid-October to mid-December)



Results

Weeks 1 - 2

Both activity and toxin analyses below the alarm thresholds.

Week 3

Activity measurements triggered an ALARM for “**moderate risk**” while toxins in shellfish not problematic.

Week 4

Activity continued rising up (toxic risk level “**high**”), that correlates well with toxin measurements which overpassed the sales ban threshold for mussels.

Week 5

2nd activity value not integrated because of sampling issue: strong wind situation is likely to have induced a migration of *Dinophysis* down in the water column (below the 1m sampling depth). Nevertheless, Microbia Environnement informed the shellfish manager to keep the risk level at “**high**”. Toxin concentrations in mussels were still above the threshold, not the case for oysters.

Week 6

Peak situation: max activity values observed (toxic risk level “**very high**”) while toxin concentrations in both mussels and oysters above sales ban thresholds.

Week 7

Activity measurement indicating bloom decline, trend confirmed afterwards and correlation with toxin concentrations in oysters (back below the threshold). Concentrations in mussels still above the threshold, probably because more sensitive to released toxins due to bloom collapsing.

Week 8

Activity still low but suddenly increasing again, indicating the occurrence of a new bloom

Conclusions

Benefits from the *Microbia Environnement* method

Rapid results	3h after water sample reception (up to 10 days with conventional system)
High sensitivity	Activity measurements were the first to trigger an alarm (week 3).
Early detection	Alarm given 9 days before the 1 st problematic toxin measurement.
Prediction	Indication of <ol style="list-style-type: none">1) bloom decline at the end of week 6,2) confirmation by next 3 successive values on weeks 7-8,3) new bloom occurrence in upcoming days (week 9)
Action	Optimization of stock management and shellfish collection, in real time, while toxin information provided too late. High value for decision-making before the Christmas sales!