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## Denne ukas viktigste

### **Registrering av nye tidsskrift i nivå 1 innan 29. oktober**

For å få kreditert publikasjonspoeng må tidsskriftet (eller for bøker og antologiar, forlaget) vera med i registeret. Dersom eit tidsskrift eller forlag manglar kan framlegg sendast til NSD elektronisk her: <http://dbh.nsd.uib.no/kanaler/>

Frist for registrering av manglande tidsskrift/forlag for å få kreditt for publikasjonar i 2007 er 29. oktober, så dette må gjerast straks. Nye tidsskrift kan berre registrerast i nivå 1, som gjev om lag 40.000 til UiB.

### **Viktige tidsfrister**

Mer info om følgende utlysninger og mange flere (inkl. løpende, dvs. uten frister) finner du [her](#)

**Husk å sende søknadsutkastet til [post@bio.uib.no](mailto:post@bio.uib.no) 1 uke i forveien** (gjelder ikke mindre bevilgninger som legater og fonds)

- |               |   |                |   |
|---------------|---|----------------|---|
| <b>Nov.</b>   | Call for IDEAS Advanced Investigator Grant                                | <b>28. nov</b> | NFR numerous deadlines kl.18:00             |
|               | Call for CAPACITIES Research Infrastructure                               |                | More information on <a href="#">bio-web</a> |
| <b>1. nov</b> | Nordic Marine Academy: mobility grants, scientific workshops and seminars | <b>1. des</b>  | Olaf Grolle-Olsens legat                    |
|               |   | <b>19. des</b> | Norsk-polsk Forskningsfond                  |

## Essentials in English

### **What about microbes in the air?**

Biologists at UiB have been world leaders in demonstrating the quantity and diversity of microbial organisms that are present in seawater as well as in extreme environments such as oil reservoirs. Now researchers at BIO are turning their attention to microbial organisms in the air!

Runar Thyraug was part of the team of researchers from BIO that traveled to Ny-Ålesund this August where he had the opportunity to collect air samples on Zeppelin mountain at the [Norwegian Institute for Air Research \(NILU\)](#).

Thyraug says that he is currently testing different methodologies both for collecting and analysing air samples. There are also factors such as wind direction, weather and seasonal variation to consider as well. [Read more](#) about his work (in Norwegian)

### **Feedback from the Rector and University Director on the new state budget**

Both UiB's Rector, [Sigmund Grønmo](#) and Director, [Kari Tove Elvbakken](#), have made powerpoint presentations summarising the new state budget and its relevance to UiB. Although they are in Norwegian, they are fairly easy to understand and highlight the priorities and challenges for UiB in the coming year.

## Siste nytt fra BIO

### **Dorothy Dankel: increased scientific accuracy not sufficient for good fisheries management**

PhD student **Dorothy Dankel**, professor **Øyvind Ulltang** and researcher Dankert Skagen at IMR have recently published a paper entitled "Fisheries management in practice: a review of 13 commercially important fish stocks" in the scientific journal *Reviews in Fish Biology and Fisheries*. The paper addresses the fact that increased scientific accuracy is not sufficient to ensure good management. It gives some examples of both successful and unsuccessful cases in fishery management. [Learn more](#)



### **Til fjells for å samle luft**

Vi er på veg vekk frå sentrumseksosen for å få litt rein fjellluft i lungene - og i støvsugarposane. Biologane skal samle luft på Fløien, ta han med seg heim og sjå om dei finn bakteriar.



– Det finst veldig lite dokumentasjon på kor mykje bakteriar som finst i luft, og det handlar mykje om metodeproblem, fortel **Runar Thyrhaug**, som elles har drive mest med marine mikroorgansimar.

No vonar biologane at ein del metodar dei har brukt i marin forskning, også kan vise seg å vere nyttige for å studere bakteriar i luft.

**Ruth Anne Sandaa** og **Runar Thyrhaug** riggar opp innsamlingsapparat i bitande vind.

– Dette er først og fremst metodetesting. Vi skal teste ulike innsamlingsmetodar og analysemetodar. Elles er målet å studere bakteriane i lufta og sjå om samansettinga endrar seg med ulike

vindretningar, vêrtypar og årstider, seier Thyrhaug, som derfor har sett seg på Fløibana saman med fleire kollegaer denne ettermiddagen. Les mer [På Høyden ..](#)

### **Alpine botanical expedition to the Tibetan Himalaya 2005**

In July 2005 **John** and **Hilary Birks** led an alpine botanical expedition to the Kangshung area east of Mt Everest. The expedition consisted of 22 botanists from UK, Ireland, Norway, Holland, Denmark, and Australia, 2 Tibetan guides, 10 Sherpas, 42 yaks, and 16 Tibetan yak-herders. The area had only been examined for plants once before, by the Mt Everest Reconnaissance 1921 Expedition and only 125 species were recorded. On this trip a total of 802 species were found, including 5 previously undescribed species such as the spectacular *Meconopsis tibetica*, 7 species were found new to China, and 40 species were found new to Xizang (Tibet).

The details of the 2005 expedition have now been published in a Tibet Special Issue of *The Alpine Gardener*, the Bulletin of the Alpine Garden Society who sponsored the Expedition. John and Hilary Birks have published in the Special Issue a 60-page article with 105 colour photographs. The full plant and bird species lists are available at [www.eecrg.uib.no](http://www.eecrg.uib.no).



### **Pasjon for pollen**

Ørsmå pollenkorn kan fortelje kva som gjekk føre seg for mange tusen år sidan. Men først må forskarane telje – ein, to, tre... ein million.

Kalkulator, neglelakk, dopapir, mikroskop. Standardutstyret er spreidd utover pulten til førsteamanuensis og pollenanalytiker **Aage Paus**.

– Eg har blitt ein tilhengar av tynn is, seier han og lener seg fornøgd tilbake i den lilla kontorstolen.

Skapet over er pynta med foto frå naturen på Dovre, eit postkort frå Texas, ei oppmoding frå Greenpeace om å sykle, samt eit utklipp frå VG som slår pollenalarm på vegne av vannvittige mange. Les mer på [forskning.no..](#)

### **Vigdis Vandvik og John-Arvid Grytnes vil kvakksalveriet til livs**

*Naturforvaltningen er preget av føleri, mener økologene Vigdis Vandvik og John Arvid Grytnes.*

De har mye kunnskap om sine saksfelt, men hvordan skal forskere forholde seg til politiske beslutningsprosesser?

Økologene **Vigdis Vandvik** og **John-Arvid Grytnes** møttes til en prat om forskning, meninger og politikk. Les mer på [forskning.no ..](#)



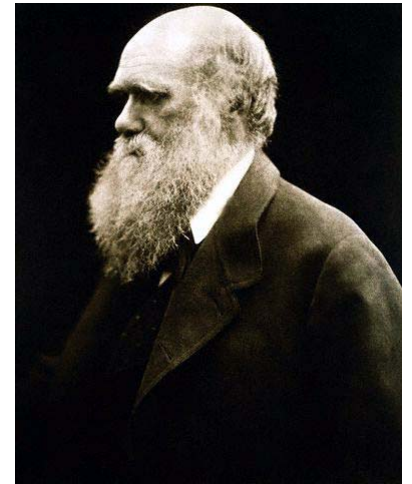
## Darwindagen 2008

Verden over feires Darwindagen **12. februar**, og 2007 var første gang den ble holdt i Bergen. Programmet inneholdt åpne foredrag på dagtid og foredrag/debatt på Det akademiske kvarter om kvelden, og NRK's *Verdt å vite* intervjuet foredragsholder Terje Lislevand. Institutt for biologi tok initiativet sist gang, og fikk med Filosofisk institutt og Bergen Museum (Naturhistoriske samlinger) både som sponsorer, i planlegging, og som bidragsytere på selve dagen.

Nå begynner planleggingen av neste års arrangement. Hvilket fokus skal dagen ha? Hvilke navn skal vi invitere? Nytt av året er at vi er i dialog med Universitetet i Oslo om å spleise på tilreisende foredragsholdere fra utlandet. Hvordan skal vi organisere dagen for å nå ut til flest mulig? Hvordan kan dagen bidra til tverrfaglighet? Har du lyst til å være med på planleggingen eller har du idéer vi bør gripe fatt i? Vi møtes **torsdag 1. november kl. 10.00 i møterommet Realfagbygget 1. etasje, ved Bio-ekspedisjonen (gamle Botanisk institutt).**

Bli gjerne med! Du kan også ta kontakt med [christian.jorgensen@bio.uib.no](mailto:christian.jorgensen@bio.uib.no) (tlf 84618) dersom tiden ikke passer og du heller vil være med på neste møte.

Darwindagen er ikke en feiring av én viktig biologisk forsker, men en feiring av rasjonalitet, vitenskap og humanisme. Mer informasjon om Darwindagen, inkludert fjorårets program, finner du på <http://darwin.uib.no>



## BIO's Julefest

It is too early for Julenissen to be in his workshop BUT it is not too early for you to mark your calendar ...

**14 December** is the **BIO Julefest!!**



## BIO søker personalkonsulent

På grunn av vedvarende stor arbeidsmengde, hovedsakelig knyttet til ansettelses (gledelig!) trenger BIO å styrke sin administrasjon med en konsulentstilling. Gjerne en kloning av Eva Beate. [Se utlysningen her ..](#)

## Årets siste redningsdraktkurs

Siste kurs blir avholdt 30/10.(hvis det blir stor nok interesse for det.) Kurset er noe som kreves for å delta på tokt. Ta kontakt med [Mette.Hordnes@bio.uib.no](mailto:Mette.Hordnes@bio.uib.no) hvis du vil delta med navn og fødselsnummer.

## Ukens bilde



**Title:** *Meconopsis tibetica*

**Photographer:** John Birks, July 2005

**Description:** *Meconopsis tibetica* is a previously undescribed species found by John and Hilary Birks during an alpine botanical expedition to the Tibetan Himalaya in July 2005. The details of the 2005 expedition have now been published in a Tibet Special Issue of *The Alpine Gardener*, the *Bulletin of the Alpine Garden Society*, the Society that sponsored the Expedition.

**Ukens bilde:** You are invited to submit photos (electronically!) for a "Ukens bilde". Please include a very short description and credit information. Picture can be of researchers / students in action, technology, organisms, field sites ... Please send your pictures to *Ukensbildekomiteen* c/o Elinor Bartle (preferable format jpg, gif; size around 300px sq; saved for web - under 60kb).

## Siste nytt fra verden rundt oss

### Rektor og universitetsdirektør orienterer om statsbudsjettet

Rektor [Sigmund Grønmo](#) og universitetsdirektør [Kari Tove Elvbakken](#) har gitt redegjørelser for hvordan statsbudsjettet vil slå ut for UiB. De er lesverdige og forståelige som powerpoint uten lydfil.

### NFR etterlyser satsing på forskning i klimameldingen

*Dere husker vel statministeren som i nyttårstalen sammenlignet regjeringens kommende gasskraftsatsning med John F Kennedys månelandingsprogram? Vel, nyttårsløfter er jo en egen genre som har iboende lav holdbarhet...*

I sin høringsuttalelse til regjeringens klimamelding peker Forskningsrådet på at meldingen, tross gode begrunnelser for å satse på forskning og teknologiutvikling for å oppnå miljøeffekter, er svak på konkretisering av hvordan dette skal skje. Les mer om [NFRs høringsuttalelse her](#) ..

### NIFU STEP: Forskningsbudsjettet vokser for lite

NIFU STEP har sett på regjeringens budsjettforslag for 2008. I følge stiftelsen får forskning en vekst neste år som ligger litt i underkant av veksten i det totale statsbudsjettet. Økt EU-kontingent utgjør en stor andel av veksten i forskningsbevilgningene og det er realvekst for universiteter og høyskoler. Les mer i [forskning.no](#) ..



### Open House at Bergen Museum

**1. Halloween Night: October 31st** The Cultural History Museum will be open from 6 p.m. until 10 p.m. Free entrance for everyone. There will be pumpkin carving, facing painting, treasure hunt in a darkened museum--bring a flashlight--there will also be flashlights to use at the museum; films, bobbing for apples, story-telling, etc! Fun for kids ages 3-83!

**2. Stone Day:** Free admission on SUNDAY, **November 4th**, 11 a.m. until 4 p.m. This includes both museums DKS (see above) and The Natural History Collections. Bring in stones that you want to find out more about. Come and see the collections at both museums. Speak with geologists!

### Faglig-pedagogisk dag i 2008

Det er ønskelig med flere bidrag fra MN-ansatte på Faglig-pedagogisk dag i 2008, og fristen for å melde tema er nå utsatt til 10. november. [Les mer](#)

### John S. Gray (1941-2007)

Professor John S. Gray ved Biologisk institutt ved UiO døde søndag av kreft.. Gray var en ledende benthosøkolog med stor vekt også på forurensningsstudier. Han har skrevet over 120 vitenskapelige arbeider, han er ISI highly cited scientist, og han har fått flere utmerkelser, blant annet Fridtjof Nansen-prisen fra Vitenskapsakademiet.

## Forskning: utlysninger, nye satsinger og prosjekter

### Grollefondet lyser ut legatmidler i botanikk

OLAF GROLLE OLSENS LEGAT TIL UNIVERSITETET I BERGEN MED TILFØRSEL AV ARV ETTER MIRANDA BØDTKER - UTLYSING 2008

**Søknadskjema:** [lenke til skjema](#) **Raportskjema:** [lenke til skjema](#) **Søknadsfrist:** 1. desember 2007

Kvart år i mars vert det delt ut midlar frå Olaf Grolle Olsens legat til Universitetet i Bergen med tilførsel av arv etter Miranda Bødtker. Midlane skal brukast til botanisk forskning ved UiB, og plantemateriale som vert innsamla med støtte frå legatet skal tilkoma Herbarium BG.

Kontaktperson: professor Dagfinn Moe, tlf. 55 58 33 39

### Postdoc position in fisheries oceanography

Postdoc will be working at the NMFS Southwest Fisheries Center in San Diego with a multidisciplinary team of scientists from the CalCOFI program, the Scripps Climate Research Division, and UCLA. First advertised October 17<sup>th</sup>. [More information](#). US citizenship is not required.

## Two PhD opportunities

(1) PhD Studentship in Ecological Modelling - National Oceanography Centre, Southampton  
The studentship will run for three years and will start as soon as the student is available. Application deadline: 12 November. [More information](#).

(2) PhD scholarship in Marine Ecology and Statistics- "Biodiversity highways and biogeographic origins: a voyage of discovery in the deep sea" - University of Auckland, New Zealand Term: 3 years  
Starting: early 2008 Application deadline: 30 November [More information](#).

## Gjesteforelesninger, seminarer og kollokvier

### Seminar about FP7 and BIO with Simone Heinz from 'Forskningsavdelingen'

Wednesday 14 November, HIB 329C1 13:00-16:00 All welcome!

**Simone Heinz** from the Department of Research Management at UiB

(Forskningsavdelingen) will come to present some of the possibilities for BIO researchers in FP7 and to answer questions. All are welcome.



### Climate meeting in Brussels

The Department of Research Management ('Forskningsavdelingen') informs us of a meeting:

International Symposium on FUTURE CLIMATE, IMPACTS AND RESPONSES and The IPCC Fourth Assessment Report & EC Integrated Climate Research More information: 19-20 November 2007 in Brussels. Deadline for registration **30 October**. [Agenda](#) / [Registration form](#)

### Ukens orientering, H1: miljøpåvirkning og nydannelse av hjerneceller

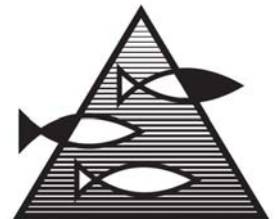
Tid og sted for Ukens orientering: Onsdager kl. 12.15-13.15, Havforskningsinstituttets kantine, Nordnesgaten 50

#### Onsdag 31. oktober

Nydannelse av hjerneceller hos krepsdyr og fiskelarver; en målestokk for miljøpåvirkning?

Foredragsholdere: **Gro og Terje van der Meeren**

Forskeropplæring i utlandet gir åpning for nye forskningsfelt med relevans for norsk havforskning. Gro og Terje van der Meeren forteller om utbyttet av sitt år som gjesteforskere i USA.



### Ukens orientering, H1: formidling av forskning til allmennheten

#### Onsdag 7. november

Forskningsformidling

Foredragsholder: **Ralph Jewell**, Institutt for filosofi, UiB

Formidling av forskning til allmennheten, med utgangspunkt i Michael Faradays brev til Dan Abbott.

## Nye artikler

### Dorothy Dankel og Øyvind Ulltang: hvordan forvaltes fiskebestandene, egentlig?

Dankel D, D Skagen & Ø Ulltang 2007. Fisheries management in practice: a review of 13 commercially important fish stocks. Reviews in Fish Biology and Fisheries, DOI 10.1007/s11160-007-9068-4

**Abstract:** This paper comparatively reviews several commercially important fish stocks, their state and their management in various regions of the world including Japanese anchovy, Bay of Biscay anchovy, North Sea sandeel, North Sea herring, Icelandic cod, Barents Sea cod, South African cape hakes, sockeye salmon, chinook salmon, southern bluefin tuna, Pacific halibut, Greenland halibut and Patagonian toothfish.

The reviewed fish stocks are systemized in three categories: (1) stock properties and status; (2) management structure and objectives; and (3) management advice. We gather evidence to outline qualities of management regimes that are recommended and highlight those that most often fail. Robust management, biological limits (reference points), implementation and consensus are critical points that separate successful and unsuccessful management regimes. We evaluate each fish stock's

management performance relative to its management objectives and current conservation issues. Furthermore, we point out the importance of stakeholder involvement in fisheries management as well as the problems that international fisheries commissions face through examples from the case studies. Management successes tended to be single-nation and single-stock fisheries with capacity control and clear stakeholder involvement. Fisheries with fleet overcapacity, unclear objectives and illegal activity characterized the case studies with management problems.

### **Tor Eiliv Lein: liten genetisk variasjon i fenotypisk plastisitet i blæretangbestand**

Stige LC, DL Lajus, EV Shoshina & TE Lein 2007. Macro-alga population shows low but significant heterogeneity in developmental instability with no detectable association with individual fitness. *Biological Journal of the Linnean Society* 92: 277–286

**Abstract:** We studied among-individual variation in developmental instability (DI) and fitness-related parameters in 80 individual plants of *Fucus vesiculosus* (Phaeophyta). To minimize differential environmental effects, plants were sampled from one environmentally homogenous population. DI was measured as fluctuating asymmetry (FA) of four bilaterally symmetric traits (branch length, receptacle length and width, and bladder width) for an average total of 30 structures per individual. FA levels varied significantly among individual plants, consistent with a coefficient of variation of 0.12 for organism-wide DI or 0.13–0.21 for trait-specific DI. These values are lower than estimates for other organisms, suggesting that the genetic heterogeneity in DI was low. The data provide some evidence for organism-wide DI, but simulations show that organism-wide and trait-specific variation cannot be conclusively separated. Growth rate of branch tips was determined experimentally, demonstrating significant variation among individuals. FA was not significantly correlated with growth rate or with morphological variables associated with fecundity, age, size, and health. At the same time, the signs of all the correlation coefficients were consistent with the expectation of a negative relationship between DI and fitness. The simulations indicated that the correlation between FA and the underlying DI was comparatively strong (high hypothetical repeatability), implying that the lack of significant associations between FA and fitness variables reflected a weak relationship between DI and these fitness parameters. This weak relationship may be related to the low amount of DI variation in the study population.

### **Egil Karlsbak: formering av sovesyke i flatfisk**

Burreson EM & Karlsbakk E 2007. Multiplication of *Trypanosoma pacifica* (Euglenozoa : Kinetoplastea) in English sole, *Parophrys vetulus*, from Oregon coastal waters. *JOURNAL OF PARASITOLOGY* 93: 932-933

**Abstract:** Multiplication of *Trypanosoma pacifica* was common in the fish host from observations of live flagellates and Giemsa-stained blood smears. Multiplication began with the elongation of the kinetoplast, thickening of the posterior portion of the body, and appearance of a new flagellum near the kinetoplast. The new flagellum was very rigid when less than 3  $\mu$  m in length, but it became flexible as it elongated. When the new flagellum was approximately 12  $\mu$  m in length, cell division began and the kinetoplast also began to divide. The timing of nuclear division was variable. Generally, it did not occur until division of the kinetoplast had begun, but occasionally binucleate individuals were observed before cell or kinetoplast division was apparent. As division continued, 1 nucleus migrated past the dividing kinetoplast into the future daughter trypanosome. Finally, the kinetoplast completed division and the trypanosomes separated. Cell division was unequal, with the daughter trypanosome being smaller than the parent and with a more weakly developed undulating membrane.

### **Tom Ole Nilsen, Lars Ebbesson & Sigurd Stefansson: ATP-aser i laksegjeller**

Nilsen TO, Ebbesson LOE, Madsen SS, McCormick SD, Andersson E, Bjørnsson BT, Prunet P, Stefansson SO 2007. Differential expression of gill Na<sup>+</sup>,K<sup>+</sup>-ATPase alpha- and beta-subunits, Na<sup>+</sup>,K<sup>+</sup>,2Cl<sup>-</sup> cotransporter and CFTR anion channel in juvenile anadromous and landlocked Atlantic salmon *Salmo salar*. *JOURNAL OF EXPERIMENTAL BIOLOGY* 210: 2885-2896

**Abstract:** This study examines changes in gill Na<sup>+</sup>, K<sup>+</sup>-ATPase (NKA) alpha- and beta-subunit isoforms, Na<sup>+</sup>, K<sup>+</sup>, 2Cl<sup>-</sup> cotransporter (NKCC) and cystic fibrosis transmembrane conductance regulator (CFTR I and II) in anadromous and landlocked strains of Atlantic salmon during parr-smolt transformation, and after seawater (SW) transfer in May/June. Gill NKA activity increased from

February through April, May and June among both strains in freshwater (FW), with peak enzyme activity in the landlocked salmon being 50% below that of the anadromous fish in May and June. Gill NKA-alpha 1b, -alpha 3, -beta 1 and NKCC mRNA levels in anadromous salmon increased transiently, reaching peak levels in smolts in April/May, whereas no similar smolt-related upregulation of these transcripts occurred in juvenile landlocked salmon. Gill NKA-alpha 1a mRNA decreased significantly in anadromous salmon from February through June, whereas alpha 1a levels in landlocked salmon, after an initial decrease in April, remained significantly higher than those of the anadromous smolts in May and June. Following SW transfer, gill NKA-alpha 1b and NKCC mRNA increased in both strains, whereas NKA-alpha 1a decreased. Both strains exhibited a transient increase in gill NKA alpha-protein abundance, with peak levels in May. Gill alpha-protein abundance was lower in SW than corresponding FW values in June. Gill NKCC protein abundance increased transiently in anadromous fish, with peak levels in May, whereas a slight increase was observed in landlocked salmon in May, increasing to peak levels in June. Gill CFTR I mRNA levels increased significantly from February to April in both strains, followed by a slight, though not significant increase in May and June. CFTR I mRNA levels were significantly lower in landlocked than anadromous salmon in April/June. Gill CFTR II mRNA levels did not change significantly in either strain. Our findings demonstrate that differential expression of gill NKA-alpha 1a, -alpha 1b and -alpha 3 isoforms may be important for potential functional differences in NKA, both during preparatory development and during salinity adjustments in salmon. Furthermore, landlocked salmon have lost some of the unique preparatory upregulation of gill NKA, NKCC and, to some extent, CFTR anion channel associated with the development of hypo-osmoregulatory ability in anadromous salmon.

### **Thomas Torgersen: sårbarhetsuavhengig dødelighet**

Torgersen T 2007. Aggregated predators and vulnerability-independent mortality of prey. *Can. J. Fish. Aquat. Sci.* 64: 941-955

**Abstract:** I present a mechanistic predation model with explicit representation of predator aggregation for analysing the relationship between mortality rate of prey and their vulnerability (e.g., conspicuousness, escape ability). The model is developed for an aquatic setting with plankton as prey and planktivores as predators, but the principle is general. When predators are aggregated, encounters between prey and predators are not independent events. This means that a prey that runs into one predator is more likely to run into more predators, and any prey that runs into a high number of predators will eventually be perceived and captured, almost irrespective of how cryptic it is or how well it escapes attacks. A prey that has not run into a predator yet is more likely to continue to not run into predators and may therefore avoid predation even if it displays no crypsis or anti predation behaviour. Therefore, the predation risk from aggregated predators is less dependent on prey vulnerability than the intuitive proportionality relationship that applies to predation risk from solitary predators. This has important implications for patterns of mortality within prey communities (e.g., size dependency of plankton mortality).

### **Øyvind Fiksen, Christian Jørgensen, Trond Kristiansen & Frode Vikebø: forbindelsen mellom atferdsøkologi og oseanografi**

Fiksen Ø, C Jørgensen, T Kristiansen, F Vikebø & G Huse 2007. Linking behavioural ecology and oceanography: larval behaviour determines growth, mortality and dispersal. *MEPS* 347: 195-205

**ABSTRACT:** Highly resolved general circulation models (GCMs) now generate realistic flow fields, and have revealed how sensitive larval drift routes are to vertical positioning in the water column. Sensible representation of behavioural processes then becomes essential to generate reliable patterns of environmental exposure (growth and survival), larval drift trajectories and dispersal. Existing individual-based models involving larval fish allow individuals to vary only in their attributes such as spatial coordinates, and not in their inherited behavioural strategies or phenotypes. We illustrate the interaction between short-term behaviour and longer-term dispersal consequences applying a model of larval cod *Gadus morhua* drifting in a GCM, and show how variations in swimming behaviour influence growth and dispersal. We recommend a deep integration of oceanography and behavioural ecology. First, we need to understand the causes and survival value of behaviours of larval fish, framed in terms of behavioural ecology. Second, we need practices to address how drift and dispersal of offspring are generating spawning strategies (timing and location) of adults, using life history theory. Third, the relative importance of local growth and mortality versus the need to drift to



particular areas depend strongly on the mobility of organisms at the time of settling, or the spatial fitness-landscape. The field of ‘individual-based ecology’ provides sound methods to approach this interface between evolutionary theory and physical oceanography.

**Frode Vikebø, Christian Jørgensen, Trond Kristiansen & Øyvind Fiksen:  
driftsmodell av torsk med regelstyrt atferd**

Vikebø F, C Jørgensen, T Kristiansen & Ø Fiksen 2007. Drift, growth, and survival of larval Northeast Arctic cod with simple rules of behaviour. MEPS 347: 207-219

**ABSTRACT:** Due to vertical variations in ocean circulation, larval Northeast Arctic cod *Gadus morhua* may influence their own drift routes by migrating vertically. By coupling a larval individual-based model and a general circulation model, we simulated larval vertical positioning according to simple rules based on individual risk sensitivity. This enabled us to investigate how larval growth, survival and horizontal distribution vary between individuals following different rules. Immediate depth selection follows from the rules, with implications for environmental exposure and instantaneous growth rates. The behavioural rules had long-term and large-scale consequences, since vertical positioning influences the drift trajectory of the larva, and thereby the physical environment the larva experiences along its way. Two alternative rule formulations were explored, each containing the full range of strategies, from maximising immediate growth to maximising immediate survival. Fitness was defined as accumulated survival probability up to 18 mm for larvae released at 2 important spawning grounds in the Lofoten area. Both rules gave better fitness than for individuals drifting at fixed depths. The most successful individuals performed active vertical migration and had an intermediate risk sensitivity. When risk sensitivity was allowed to change with ontogeny, larvae that first emphasised growth and then changed to intermediate risk sensitivity were the most successful ones, although improvements were minor compared to fixed sensitivities. The 2 spawning grounds led to slight differences in fitness, but success as a result of risk sensitivity was similar at both, suggesting that optimal larval strategies may be robust across different spawning grounds.