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Centre for Ecological and Evolutionary Studies (CEES)

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Board: Prof. dr. H. Olf, Director
Prof. dr. J.L. Olsen, Chairman
Prof. dr. J. Komdeur
Prof. dr. ir. J.D. van Elsas

| Members: | Tel. numbers: |
|-------------------------------|----------------------|
| Bakker, Prof. dr. J.P. | 3632221 |
| Beukeboom, Prof. dr. L.W. | 3638448 |
| Bijlsma, Prof. dr. R. | 3632117 |
| Dietz, Dr. M.W. | 3632235 |
| Elsas, Prof. dr. ir. J.D. van | 3632151 |
| Elzenga, Prof. dr. J.T.M. | 3632307 |
| Eriksson, Dr. B.D.H.K. | 3632098 |
| Falcao Salles, Dr. J. | 3632161 |
| Hemelrijk, Prof. dr. C.K. | 3638084 |
| Kok, Dr. L.J. de | 3632277 |
| Komdeur, Prof. dr. J. | 3632056 |
| Koppel, Prof. dr. J. van de | |
| Olf, Prof. dr. H. | 3632214 |
| Olsen, Prof. dr. J.L. | 3632260 |
| Palsbøll, Prof. dr. P.J. | 3639882 |
| Pen, Prof. dr. I.R. | 3632290 |
| Piersma, Prof. dr. T. | 3632037 |
| | 0222 - 369485 |
| Schilthuizen, Prof.dr. M. | 3632092 |
| Smit, Dr.ir. C. | 3638833 |
| Stam, Prof. dr. W.T. | 3632252 |
| Tieleman, Prof. dr. B.I. | 3638096 |
| Tinbergen, Prof. dr. J. | 3632373 |
| Weissing, Prof. dr. F.J. | 3632131 |
| Wertheim, Dr. B. | 3639039 |
| Zande, Dr. L.P.W.G.M. van de | 3632126 |

Dissertations granted by CEES in 2011

- J. van de Crommenacker** Hard times in paradise? Oxidative status, physiology and fitness in the tropical Seychelles warbler
Promotor Prof.dr. J. Komdeur, University of Groningen
- P.R. Hardoim** Bacterial endophytes of rice - their diversity, characteristics and perspectives
Promotor Prof.dr.ir. J.D. van Elsas, University of Groningen
- Ö. Inceoglu** The functional and structural microbial diversity of soil under potato (baseline)
Promotor Prof. dr. ir. J. D. van Elsas, University of Groningen
- E. Kanga** The Kenyan Hippo: Population dynamics, impacts on riparian vegetation and conflicts with humans
Promotores Prof.dr. H. Olf, University of Groningen
- F.Z. Mostafa Ali** The determinants of salinity tolerance in maize (*Zea mays* L.)
Promotor Prof.dr. J.T.M. Elzenga, University of Groningen
- A. Ordoñez** Understanding plant invasions: a global scale meta-analysis
Promotor Prof.dr. H. Olf, University of Groningen
- W. Patberg** Solute transport in *Spagnum* dominated bogs. The ecophysiological effects of mixing by convective flow. Promotores: Prof.dr. J.T.M. Elzenga, Prof.dr. A.P. Grootjans, University of Groningen
- R. Radersma** The ecological and evolutionary consequences of brood sex ratio variation.
Promotores: Prof. dr. ir. J. Komdeur , Prof. dr. J.M. Tinbergen.
University of Groningen
- D.A.P. Reid** Modelling the hydrodynamics of swimming fish, from individuals to infinite schools
Promotor Prof.dr. C.K. Hemelrijk, University of Groningen
- M. Shahbaz** Copper toxicity and sulphur metabolism in Chinese cabbage
Promotor Prof.dr. J.T.M. Elzenga, co-promotor Dr. L.J. de Kok,
University of Groningen
- O.H. Vedder** All's fair in love and war. Reproductive strategies, intra-specific competition and sexual selection in blue tits
Promotor Prof.dr.ir. J. Komdeur, University of Groningen

- C. Veen** Living apart together : interactions between aboveground grazers, plants and soil biota
Promotores Prof.dr. H. Olff, University of Groningen
- E.C. Verhulst** Genetic basis of sex determination in the haplodiploid wasp *Nasonia vitripennis*
Promotor Prof.dr. L.W. Beukeboom, University of Groningen
- S. de Visser** Community and food web structure of an African savanna : consequences of alternative land use practices
Promotor Prof.dr. H. Olff, University of Groningen

Dissertations granted by CEES in 2011, prepared within another institution

- J. Leyrer** Being at the right place interpreting the annual life cycle of Afro Siberian red knots
Promotores Prof.dr.Th. Piersma, University of Groningen
- S. Yaakop** A taxonomic and phylogenetic study of the oriental Alysiinae and Opiinae (Hymenoptera braconidae)
Promotor Prof.dr. M. Schilthuizen, University of Groningen

CEES PhD students in 2011

- T. Aghajanzadeh** *Ecophysiology of Plants / Razi Med. Diag. Lab Iran*
Fungicide effects of volatile sulfur compounds
- S.M. Amini Nasab** *BESO / Univ. Behbahan, Iran*
Individual variation in parental fitness in blue tits: effects of maternal effects, clutch/brood size and environmental variables
- N.D.P. Bhola** *Community and Conservation Ecology / UE-bursary*
Characterization of the scale of spatial heterogeneity in savanna systems as novel approach to improving conservation planning
- A.I. Bijleveld** *Animal Ecology / NIOZ*
Cost-benefit analyses of flocking in shorebirds, with a focus on information exchange
- R. Bom** *Animal Ecology / NIOZ*
Cascading predator-prey effects in a pristine seagrass-based food web

| | |
|-------------------------------------|---|
| V.S. Brauer | <i>Theoretical Biology</i> Temperature-controlled phytoplankton experiments |
| C. Burger | <i>Animal Ecology / RUG-FWN</i> Latitudinal dispersal as solution to insufficient adaptation to climate change |
| C.J. Camphuysen | <i>Animal Ecology / NIOZ</i> Population biology of lesser black-headed gulls in The Netherlands |
| M. de Cássia Pereira e Silva | <i>Microbial Ecology / NWO</i> Assessment of the baseline of soil microbial functioning across a range of soils |
| R.F. Castillo Cajas | <i>Theoretical Biology / EU-Marie Curie</i> Modes of speciation and biodiversity patterns |
| V. Cordlandwehr | <i>NWO-ALW / Community and Conservation Ecology</i> Plant functional traits and assembly of plant metacommunities in fragmented landscapes |
| M.S. Cretoiu | <i>Microbial Ecology</i> Meta genomics-based exploration of soils and aquatic samples |
| W. Diao | <i>Evolutionary Genetics</i> Genetics and genomics of presygotic isolation in <i>Nasonia</i> |
| F. Dini Andreote | <i>Microbial Ecology / NWO</i> Microbial succession in salt marsh: The ecological and functional properties of communities |
| S. Donadi | <i>Marine Benthic Ecology and Evolution</i> Interactions between benthic communities and local resource conditions: bivalves, polychaetes and sediment stability |
| X. Du | <i>Community and Conservation Ecology / Grant Chinese Academy of Sciences</i> Progress in neutral theory for ecological communities |
| A.L.F. Duarte | <i>Theoretical Biology / RUG bursary</i> Division of labor in insect societies – integrating self-organization and evolutionary theory |

- S. Duijns** *Animal Ecology / NIOZ*
Foraging ecology of the Bar-tailed Godwit, *Limosa lapponica*
- K. Elschot** *Community and Conservation Ecology / OIO / NWO-ALW*
Biotically created vegetation heterogeneity during early primary succession on salt marshes
- F.A. Encinas Viso** *Community and Conservation Ecology / UE-Bursary*
Theoretical study of mutualistic interaction webs
- W. Fokkema** *Community and Conservation Ecology / Metawad, Waddenfonds*
Brent geese in the Waddensea: coupling individuals' habitat use to species influence on (meta)ecosystem functioning
- J. de Fouw** *Animal Ecology / NIOZ*
Pervasive impact of intertidal migrant top predators on species diversity and size structure of its prey may lead to spatial knock-on effects between ecosystems
- C. Fritz** *RUG Bursary / Ecophysiology of Plants*
Limits of *Sphagnum* bog growth in the New World
- M. van der Geest** *Animal Ecology / NIOZ*
Fragile biodiversity linkages: production and consumption in a nutrient-poor seagrass-dominated intertidal ecosystem
- S. Gerritsma** *Evolutionary Genetics*
Identifying genomic variation among natural *Drosophila melanogaster* populations and its association to immunological resistance against parasitoids
- J. van Gestel** *Theoretical Biology*
The eco-evo-devo of biofilm formation
- E. Geuverink** *Evolutionary Genetics*
Genetics of sex determination in haplodiploid wasps
- M.C.W.G. Giesbers** *Evolutionary Genetics*
Genetics of adaptation: mating behaviour and reproductive strategies in *Nasonia* wasps
- S. Grizard** *Animal Ecology / RUG-FWN*
How microbes shape bird eggs

| | |
|----------------------|--|
| M. Hammers | <i>BESO / NWO / ALW</i> Individual model based analysis of the causes of senescence in a wild living cooperative breeding vertebrate species |
| R.A. Howison | <i>Community and Conservation Ecology / RUG</i> Plant-plant interactions along biotic & abiotic stress-gradients at salt marshes |
| Ö. Inceoglu | <i>Microbial Ecology / NWO</i> Development of molecular method to assess microbial diversity in potato |
| O.J. Ivanov | <i>Theoretical Biology</i> Network design and the response of complex systems to stress and deterioration |
| A.B.F. Ivens | <i>Theoretical Biology / RUG bursary</i> Evolutionary ecology of the mutualism between yellow meadow ants and root aphids |
| K.M. Jalvingh | <i>Evolutionary Genetics</i> Genetic stress responses of <i>Drosophila</i> species in relation to their geographic distribution and population dynamics |
| T. Janzen | <i>Community and Conservation Ecology</i> The origin and maintenance of biodiversity |
| B. de Jong | <i>BESO / Instituut voor Wetenschap en Techniek, België / University of Gent / RUG</i> Influence of testosterone on female life history traits and fitness in great and blue tits |
| J. Jouta | <i>Animal Ecology / NIOZ</i> Food webs of the Wadden Sea |
| R. Kentie | <i>Animal Ecology / Ministerie van Landbouw, Natuur en Voedselkwaliteit / RUG-FWN</i> Populatiodynamica van weidevogels |
| R. van Klink | <i>Community and Conservation Ecology / Waddenfonds / VROM</i> Biodiversity and nature management on mainland saltmarshes |

- T. Koevoets** *Evolutionary Genetics*
The genetics of postzygotic isolation in the haplodiploid sister species complex of *Nasonia*
- E. Koppelaar** *NAM / Community and Conservation Ecology*
Effects of soil subsidence following gas extraction on Ameland related to autonomous dynamics in the Wadden Sea
- M. Langenhof** *BESO / RUG - UE bursary*
Surviving in a changing world: The effects of early-life conditions on determining an individual's behavior and adaptive response later in life
- T. Lok** *Animal Ecology / NWO ALW*
Comparative demography of migratory and resident spoonbill populations with overlapping ranges
- W.J. Ma** *Evolutionary Genetics*
Ecology and mechanisms of sex determination in the *asobara* genus (hymenoptera: braconidae)
- C.A. Mallon** *Microbial Ecology*
Understanding the effects of bacterial diversity on community functioning and stability
- F.S. Mandema** *Community and Conservation Ecology / Waddenfonds / VROM*
Biodiversity and nature management on mainland saltmarshes
- K. Meijer** *Evolutionary Genetics*
Evolutionaire veranderingen in de biodiversiteit van Nederlandse insecten in respons op invasieve planten en insecten
- L. Molleman** *Theoretical Biology / UE bursary*
Human cooperation - the role of prosocial norms
- R. Nazir** *Microbial Ecology / HEC / NUFFIC bursary*
Potential mechanisms making bacteria fit in fungal-associated soil environmental niches
- H. Ndithia** *Animal Ecology / Nuffic*
Seasonal dynamics of reproductive strategies and disease in tropical grassland birds living in habitats highly threatened by land use change

- I.A. Neven** *Ecophysiology of Plants / NWO-ALW*
Southern Ocean Pacific productivity in a high-CO₂ world
- S. Nolte** *Community and Conservation Ecology / Waddenfonds / VROM*
Biodiversity and nature management on mainland saltmarshes
- A. Ordoñez-Gloria** *Community and Conservation Ecology / UE-bursary*
Trait diversity: consequences for the sensitivity of ecosystems to global change phenomena
- T. Oudman** *Animal Ecology / NIOZ*
Pervasive impact of intertidal migrant top predators on species diversity and size structure of its prey may lead to spatial knock-on effects between ecosystems
- J. Ouwehand** *Animal Ecology / NWO ALW*
Possibilities and constraints in life-cycle adaptation to climate change
- S. Paolucci** *Evolutionary Genetics*
The genetic basis of variation in reproductive diapause in *Nasonia* wasps
- S. Perez Vila** *Evolutionary Genetics / RUG Bursary*
Ecology and evolution of fly parasitoid communities
- F. van der Plas** *Community and Conservation Ecology / UE-Bursary*
Species assembly at different trophic levels over environmental gradients in a savanna ecosystem
- M. Poortvliet** *Marine Benthic Ecology and Evolution*
Population connectivity and dispersal in devil rays in the tropical Pacific
- P.E. Puentes Téllez** *Microbial Ecology / NWO*
Adaptation of *Fecoli* to heterogeneous conditions
- I. Puga-Gonzalez** *BESO / RUG bursary*
Self-organization of social behavior in primates
- K. Qureshi** *Ecophysiology of Plants*
Characterization of genes involved in the regulation of programmed cell death in *Arabidopsis thaliana*

- R. Radersma** *BESO / NWO VICI*
Influence of sex-specific competition and density on demography in the great tit
- I. Rasul** *Ecophysiology of Plants*
Characterization of resistance genes in *Arabidopsis thaliana*
- M. Reich** *Ecophysiology of Plants*
Biochemical and genetic dissection of control of plant mineral nutrition
- J.L. Ruifrok** *Community and Conservation Ecology / SBB*
How herbivores create landscape mosaics of different plant functional types in temperate ecosystems
- L. Salazar Jaramillo** *Evolutionary Genetics*
Comparative genomics of parasitoid resistance in *Drosophila* spp.
- S. Santos** *Marine Benthic Ecology and Evolution / NIOZ*
Patterns of distribution, dynamics and genetic variation in the peppery furrow shell *Scrobicularia plana*
- L. Schmaltz** *Animal Ecology / RUG / Provincie Friesland*
Comparative demography of Ruff and Golden Plover
- M.J.J. Schrama** *Community and Conservation Ecology / NWO Pionier bursary*
Food web assembly in a dynamic salt marsh
- M. Shahbaz** *Ecophysiology of Plants / NUFFIC bursary*
Copper toxicity and sulfurs metabolism in Chinese cabbage
- K. Sieben** *Marine Benthic Ecology and Evolution / NWO-ALW*
Marine trophic cascades - effects of fish diversity on coastal production
- J. Spoelder** *HLB Laboratory / Ecophysiology of Plants*
Endophytes in potato tubers
- E.E. van der Vaart** *BESO / NWO-TopTalent*
Theory of mind in corvids: Insights from modeling

- G.F. Veen** *Community and Conservation Ecology / Van der Leeuw / NWO Pionier*
Interactions between above- and belowground organisms in grazed ecosystems: consequences for spatial patterns and diversity
- E. van Velzen** *Community and Conservation Ecology / UE-bursary*
The interplay between speciation, dispersal and adaptation to local conditions in a heterogeneous environment, and its effect on food web/community structure
- L. van Walraven** *Animal Ecology / NIOZ*
Natural and anthropogenic impact on North Sea gelatinous zooplankton population dynamics: implications for ecosystem structure and functioning
- J. van der Woude** *BESO / NWO VICI*
Fitness consequences of intra-specific competition and social stress in the Seychelles warbler
- H.-Y. Yang** *Animal Ecology / NIOZ*
Staging ecology of red knots in Bohai Bay, China
- N. Yu** *Ecophysiology of Plants*
The role of receptor-like kinases in salt-induced changes or root architecture in *Arabidopsis thaliana*
- F. Zaki Mostafa Ali** *Bursary Egyptian Government / Ecophysiology of Plants*
Salt tolerance mechanism in *Zea mays*
- E. van der Zee** *NIOZ / Animal Ecology*
A regime shift in benthic organisms in the Waddensea: causes and consequences for higher trophic levels
- M. Zhang** *Microbial Ecology*
Bacterial-fungal interactions in soil and the role of plasmids

PhD Projects – Theses in preparation

- Y. Afeworki** *WOTRO / Marine Biology (Ocean Ecosystems)*
Seasonal dynamics in the trophic ecology and energetics of an important grazer (the parrot fish *Scarus ferrugineus*) on the coral reefs of Eritrea in the Southern Red Sea
- A. Ayirinhac** *IOP Genomics / Evolutionary Genetics*
Evolution of ageing

| | |
|-------------------------------|--|
| C.J. Camphuysen | <i>NIOZ / Animal Ecology</i> Population Biology of lesser black-backed gulls in The Netherlands |
| J. van de Crommenacker | <i>BESO / WOTRO</i> Stress and fitness in small bottlenecked populations of the tropical Seychelles warbler |
| S. Ferber | <i>Marine Biology (MarBEE)</i> Mechanisms underlying the genetic structure of seagrass meadows: historical stochastic events versus adaptation |
| E.O. Folmer | <i>Animal Ecology / Community and Conservation Ecology</i> Patchiness of food and the structure of shorebird communities |
| C.X. Garzon López | <i>Community and Conservation Ecology / UE-bursary</i> Determinants and consequences of the spatial arrangement of trees in the tropical rainforest of Barro Colorado, Panama |
| C.G. Gosling | <i>NWO-ALW Pionier bursary / Community and Conservation Ecology</i> Biotic determinants of functional heterogeneity in a tropical savanna |
| P.R. Hardoim | <i>Microbial Ecology / UE bursary</i> Metagenomics of food crop endophytes |
| A. Hegemann | <i>Animal Ecology / Vogelbescherming Nederland</i> Adaptations to a changing environment: in search of bottlenecks in the annual cycle of skylarks |
| S.M.A.C. van Heuven | <i>EU Carbo Ocean / Marine Biology</i> Meridional carbon transport in the North Atlantic Ocean |
| M. Hirsch | <i>BESO / NWO VICI</i> Evolution of sex-specific reproductive tactics under density-dependent selection |
| N.P.C. Horrocks | <i>Animal Ecology / NWO VENI</i> The role of seasonal dynamics in risk of disease and resource availability in life history evolution of larks in different environments |

- J. Jansen** *NIOO-CEME / Marine Benthic Ecology and Evolution*
Exploring ecotypic variation in European shellfish populations
- E.M. Kanga** *Community and Conservation Ecology / UE-bursary*
The consequences of land use change for biodiversity in Africa
- A.L.W. Kuijper** *RUG bursary / Theoretical Biology*
Genetic conflict and the evolutionary causes and consequences of sex determination systems
- J. Leyrer** *Animal Ecology / MAVA Foundation / NIOZ*
Survival repercussions of individual differences in the timing of a migration from West Africa to Central Siberia
- J.E. Oosten** *Rosalind Franklin bursary / Theoretical Biology*
Social context and behavioural syndromes: models and experiments in fish
- W. Patberg** *Ecophysiology of Plants / NWO-ALW*
Solute transport in Sphagnum dominated bogs
- D.A.P. Reid** *BESO / Rosalind Franklin bursary*
Self-organisation of fish schools
- J. Reszka** *UE Bursary / Evolutionary Genetics*
Genetic basis of inbreeding depression in two insect species
- M. van Rijswijk** *Evolutionary Genetics*
Dispersal and local adaptation in experimental metapopulations of *Drosophila melanogaster*
- E. Schut** *BESO / RUG-FWN*
Mhc based sperm competition in the Seychelles warbler and the blue tit
- M.W. Smith-Kleefsman** *Evolutionary Genetics*
Determinants of metapopulation dynamics: stochastic processes versus adaptation
- O.H. Vedder** *BESO / EC-FWN*
Conflict and cooperation over parental care in blue tits

- R.M. Veeneklaas** *Community and Conservation Ecology / Population Genetics*
Dispersal and adaptation in two salt-marsh plant species
- M.A. Versteegh** *Animal Ecology / NWO VENI / FWN*
Solutions to seasonal challenges: the interplay between energetics, corticosteroid response and immune function in avian life history
- S.N. de Visser** *Community and Conservation Ecology / UE-bursary*
Biodiversity consequences of human induced alteration of the trophic structure in tropical savannas
- A.M. Zipperle** *Ubbo Emmius Bursary / Marine Biology (MarBEE)*
Inter-relationships between reproductive ecology, genetic structure and fitness in populations of the seagrass *Zostera noltii* in the Wadden Sea – North Sea

ANIMAL ECOLOGY

<http://www.rug.nl/research/animal-ecology/>

Group leader Prof. dr. T. Piersma

Composition of the group in 2011:

| Tenured staff | source | fte | period |
|---|------------------------------|------------|-------------------------|
| Dr. M.W. Dietz | RUG | 0.6 | |
| Prof. Dr. Ir. J. Komdeur | RUG | 1.0 | |
| Prof. Dr. T. Piersma | RUG | 0.7 | |
| Prof. Dr. B.I. Tieleman | Rosalind Franklin Fellowship | 1.0 | |
| Prof. Dr. J.M. Tinbergen | RUG | 1.0 | |
| Post-docs | | | |
| Dr. C. Both | NWO-VIDI | 1.0 | 01-01-2007 – 31-03-2012 |
| Dr. K.D. Matson | NWO-VENI | 1.0 | 01-10-2008 – 30-09-2011 |
| Dr. J.W.H. Reneerkens | Metawad | 0.8 | 01-07-2011 – 01-07-2016 |
| PhD-students | | | |
| Drs. C. Burger | RUG-FWN | 1.0 | 01-05-2008 – 01-05-2012 |
| Drs. S. Grizard | RUG/FWN | 1.0 | 01-01-2010 – 01-01-2014 |
| Drs. R. Kentie | LNV / RUG FWN | 1.0 | 22-01-2007 – 06-07-2012 |
| Drs. T. Lok | NWO/ALW | 1.0 | 01-03-2008 – 01-03-2012 |
| Drs. J. Ouwehand | NWO/ALW | 0.8 | 12-04-2010 – 08-03-2015 |
| Drs. H. Ndithia | Nuffic | 1.0 | 01-06-2010 – 01-06-2014 |
| Drs. L. Schmaltz | RUG/Prov. Friesland | 1.0 | 01-11-2009 – 01-11-2013 |
| Technical and Administrative Staff | | | |
| <i>Secretary</i> | | | |
| J.G. Rietveld | RUG | 0.4 | |
| <i>Technical assistant</i> | | | |
| Drs. J.C.E.W. Hooijmeijer | RUG | 1.0 | |
| Drs. R. Ubels | RUG | 0.8 | |
| Dr. M. van der Velde | NWO VICI | 0.4 | |
| <i>IT assistant</i> | | | |
| Ing. G.J. van den Burg | RUG | 0.2 | |
| <i>(part-time) field assistant</i> | | | |
| R. Bijlsma | RUG | | |
| Y.K. Galama | RUG | | |
| Drs. N. Groen | RUG | | |
| R.P.W.M. Voesten | RUG | | |
| E. van der Velde | RUG | | |
| Other PhD students | | | |
| Drs. A.I. Bijleveld | NIOZ | 1.0 | 01-01-2010 – 01-01-2014 |
| Drs. R. Bom | NIOZ | 1.0 | 01-04-2011 – 01-04-2015 |

| | | | |
|-----------------------|------|-----|-------------------------|
| Drs. C.J. Camphuysen | NIOZ | 1.0 | |
| Drs. S. Duijns | NIOZ | 1.0 | 01-10-2009 – 01-10-2013 |
| Drs. J. de Fouw | NIOZ | 0.8 | 01-04-2010 – 01-04-2015 |
| Drs. M. van der Geest | NIOZ | 1.0 | 01-10-2006 – 01-02-2012 |
| Drs. J. Jouta | NIOZ | 1.0 | 01-01-2011 – 31-04-2015 |
| Drs. T. Oudman | NIOZ | 1.0 | 01-11-2010 – 01-11-2015 |
| Drs. L. Walraven | NIOZ | 1.0 | 01-09-2010 – 01-09-2014 |
| Drs. E. van der Zee | NIOZ | 1.0 | 01-03-2009 – 01-03-2013 |
| Drs. Yang Hang-Yan | NIOZ | 1.0 | |

PUBLICATIONS 2011

Publications in journals

- Bell, A.M., Dingemanse, N.J., Hankison, S.J., Langenhof, M.B.W. & Rollings, K. 2011. Early exposure to nonlethal predation risk by size-selective predators increases somatic growth and decreases size at adulthood in Threespined Sticklebacks. *Journal of Evolutionary Biology* **24**: 943–953
- Berzins, L.L., Gilchrist, H.G., Matson, K.D. & Burness, G. 2011. Sex-specific effects of increased incubation demand on innate immunity in Black Guillemots. *Physiological and Biochemical Zoology* **84**: 222-229
- Buehler, D.M., Versteegh, M.A., Matson, K.D. & Tieleman, B.I. 2011. One problem, many solutions: simple statistical approaches help unravel the complexity of the immune system in an ecological context. *PLoS ONE* **6**: e18592
- Burger, C. & Both, C. 2011. Translocation as a novel approach to study effects of a new breeding habitat on reproductive output in wild birds. *PLoS ONE* **6**: e18143
- Compton, T.J., Kraan, C., Rijkenberg, M.J.A., Troost, T.A., Rogers, D.I., Leyrer, J., Pearson, G. & Piersma, T. 2011. Sampling bivalves on tidal flats: possibility of missing rare species, versus smoothing of environmental variation. *Marine Ecology - Progress Series* **440**: 285-288
- Eklöf, J. S., van der Heide, T., Donadi, S., van der Zee, E. M., O’Hara, R., Eriksson, B.K. 2011. Habitat-mediated facilitation and counteracting ecosystem engineering interactively influence ecosystem responses to disturbance. *PLoS ONE* **6**: e23229
- Estrella, S.M., Storey, S.M., Pearson, G. & Piersma, T. 2011. Potential effects of *Lyngbya majuscula* blooms on benthic invertebrate diversity and shorebird foraging, ecology at Roebuck Bay, Western Australia, preliminary results. *Journal of the Royal Society of Western Australia* **94**: 171-179
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- Michler, S.P.M., Nicolaus, M., Ubels, R., Van der Velde, M., Komdeur, J., Both, C. & Tinbergen, J.M. 2011. Sex-specific effects of the local social environment on juvenile post-fledging dispersal in Great Tits. *Behavioral Ecology and Sociobiology* **65**: 1975-1986
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- Schut, E., Rivero-de Aguilar, J., Merino, S., Magrath, M.J.L., Komdeur, J. & Westerdahl, H. 2011. Characterization of MHC-I in the Blue Tit (*Cyanistes caeruleus*) reveals low levels of genetic diversity and trans-population evolution across European populations. *Immunogenetics* **63**: 531-542
- Spaans, B., van Kooten, L., Cremer, J., Leyrer, J. & Piersma, T. Densities of individually marked migrants away from the marking site to estimate population size: a test with three wader populations. *Bird Study* **58**: 130-140
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- van de Crommenacker, J., Komdeur, J., Burke, T. & Richardson, D.S. 2011. Spatio-temporal variation in territory quality and oxidative status: a natural experiment in the Seychelles Warbler (*Acrocephalus sechellensis*). *Journal of Animal Ecology* **80**: 668-680
- van de Crommenacker, J., Komdeur, J. & Richardson, D.S. 2011. Assessing the cost of helping: The roles of body condition and oxidative balance in the Seychelles Warbler (*Acrocephalus sechellensis*). *PLoS ONE* **6**, e26423
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- Vedder, O., Komdeur, J., van der Velde, M., Schut, E. & Magrath, M.J.L. 2011. Polygyny and extra-pair paternity enhance the opportunity for sexual selection in Blue Tits. *Behavioral Ecology and Sociobiology* **65**: 741–752
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Yang, H.-Y., Chen, B., Barter, M., Piersma, T., Zhou, C.-F., Li, F.-S. & Zhang, Z.-W. 2011. Impacts of tidal land reclamation in Bohai Bay, China: ongoing losses of critical Yellow Sea waterbird staging and wintering sites. *Bird Conservation International* **21**: 241-259

Professional publications

- Both, C. 2011. Spreeuwen beroven Grutto's hun prooien. *Limosa* **84**: 32-36
- Hooijmeijer, J., Bruinzeel, L.W., Van der Kamp, J., Piersma, T. & Wymenga, E. 2011. *Skriezen om útens, Trek en overwintering van gezenderde Grutto's*. A&W rapport 1675 Altenburg & Wymenga ecologisch onderzoek, Feanwâlden
- Kentie, R., Hooijmeijer, J., Both, C. & Piersma, T. 2011. Grutto's in ruimte en tijd 2007-2010, eindrapport. Directie Kennis, Ministerie van Landbouw, Natuur en Voedselkwaliteit
- Piersma, T. 2011. *Goed werk*. In: De Waddenacademie-KNAW Jaarverslag 2008 & 2009, pp. 60-61. Leeuwarden: Waddenacademie-KNAW
- Piersma, T. 2011. Diepte-investeringen. *Vogelnieuws* **2011 (5)**: 10
- Piersma, T. 2011. Het inpolderingsdrama van Bohai. *Vogelnieuws* **2011 (1)**: 11
- Piersma, T. 2011. Ontwerp een steltloper. *Vogelnieuws* **2011 (4)**: 10
- Piersma, T. 2011. Overwinteren in Spanje. *Vogelnieuws* **2011 (2)**: 12
- Piersma, T. 2011. Schrikken op Banc d'Arguin. *Vogelnieuws* **2011 (1)**: 12
- Piersma, T. 2011. Strakke reisschema's. *Vogelnieuws* **2011 (3)**: 12
- Piersma, T. 2011. Vliegend tapijt. *Vogelnieuws* **2011 (6)**: 10
- Rogers, D.I., Yang, H.Y., Hassell, C.J., Boyle, A.N., Rogers, K.G., Chen, B., Zhang, Z.W., Piersma, T. Red Knots depend on a small threatened staging area in Bohai Bay, China. *Tattler* **20**: 5
- Trierweiler, C. & Exo, K.-M. 2011. Lebensraumanalyse von Wiesenweihen-Jungvögeln mit Hilfe der Satellitentelemetrie. *Abschlußbericht DBU-Projekt 26663-33/2 26663-33/2*, 2008-2011. Institut für Vogelforschung "Vogelwarte Helgoland", Wilhelmshaven
- van Turnhout, C., Ballering, L. & Both, C. 2011. Trends in populatiegrootte en broedsucces van Bonte Vliegenvangers *Ficedula hypoleuca*: een update. *Limosa* **84**: 38-45

Books

Piersma, T., van Gils, J.A. 2011. *The Flexible Phenotype. A Body-centred Integration of Ecology, Physiology, and Behaviour*. Oxford: Oxford University Press, 238 pp. ISBN 978-0-19-923372-4.

Dissertations

Leyrer, J. Being at the right time at the right place: interpreting the annual life cycle of Afro-Siberian red knots. PhD thesis. Promotoren: Prof. dr. T. Piersma, Prof. dr. D.W. Winkler. University of Groningen The Netherlands

Behavioural Ecology and Self-organization

<http://www.rug.nl/research/behavioural-ecology-and-self-organization/>

Group leader Prof. Dr. J. Komdeur

Composition of the group in 2011:

| Tenured staff | source | fte | period |
|---------------------------------------|-----------------------|------------|-------------------------|
| Prof. Dr. C.K. Hemelrijk | RUG | 1.0 | |
| Prof. Dr. Ir. J. Komdeur | RUG | 1.0 | |
| Post-docs | | | |
| Dr. H. Hildenbrandt | RUG Rosalind Franklin | 0.5 | 15-09-2010 – 28-02-2011 |
| Dr. H. Hildenbrandt | Agentschap NL | 0.5 | 01-03-2011 – 30-11-2011 |
| Dr. H. Hildenbrandt | Agentschap NL | 0.8 | 01-12-2011 – 15-10-2012 |
| Dr. P. Korsten | NWO/RUG | 1.0 | 01-11-2011 – 01-11-2014 |
| PhD-students | | | |
| Drs. S.M. Amini Nasab | Univ. Behbahan, Iran | 1.0 | 01-08-2011 – 01-08-2015 |
| Drs. M. Hammers | NWO/ALW | 1.0 | 01-10-2008 – 30-09-2012 |
| Drs. B. de Jong | IWT / RUG | 1.0 | 01-01-2010 – 01-01-2013 |
| Drs. M. Langenhof | RUG-Ubbo Emmius | 1.0 | 01-12-2009 – 01-12-2013 |
| Drs. I. Puga-Gonzalez | RUG | 1.0 | 01-09-2007 – 01-06-2012 |
| Drs. R. Radersma | NWO-VICI | 1.0 | 16-04-2007 – 15-04-2011 |
| Drs. E.E. van der Vaart | NWO-TopTalent | 1.0 | 15-09-2007 – 15-09-2011 |
| Drs. J. van der Woude | NWO-VICI | 1.0 | 01-10-2008 – 01-10-2012 |
| Technical/Administrative Staff | | | |
| <i>Secretary</i> | | | |
| J.G. Rietveld | RUG | 0.3 | |
| <i>Technical assistant</i> | | | |
| M. van der Velde | RuG | 0.4 | |
| <i>IT-assistent</i> | | | |
| Dr. J. Bakker | RuG | 0.2 | |
| Guests | | | |
| Dr. H.L. Dugdale | | | |
| Dr. C. Trierweiler | | | |
| Drs. R. van Dijk | | | |

Publications 2011

Publications in journals

- Abbot, P. *et al.* (incl. Komdeur, J.) 2011. Inclusive fitness theory and eusociality. *Nature*: **471**, E1-E4
- Bell, A.M., Dingemanse, N.J., Hankison, S.J., Langenhof, M.B.W. & Rollings, K. 2011. Early exposure to nonlethal predation risk by size-selective predators increases somatic growth and decreases size at adulthood in Threespined Sticklebacks. *Journal of Evolutionary Biology* **24**: 943–953
- Dugdale, H.L., Hinsch, M. & Schroeder, J. 2011. Biased sampling: No 'Homer Simpson Effect' among high achievers. *Trends in Ecology & Evolution* **26**: 622
- Eikenaar, C., Whitham, M., Komdeur, J., van der Velde, M. & Moore, I.T. 2011. Endogenous testosterone is not associated with the trade-off between paternal and mating effort. *Behavioural Ecology* **22**: 601-608
- Eikenaar, C., Whitham, M., Komdeur, J., van der Velde, M. & Moore, I.T. 2011. Testosterone, plumage coloration and extra-pair paternity in male North-American barn swallows. *PLoS ONE* **6**: e23288
- Halfwerk, W., Bot, S., Buikx, J., van der Velde, M., Komdeur, J., ten Cate, C., & Slabbekoorn, H. 2011. Low-frequency songs lose their potency in noisy urban conditions. *Proceedings of the National Academy of Sciences USA* **108**: 14549-14554
- Hemelrijk, C.K. & Bolhuis, J.J. 2011. A minimalist approach to comparative psychology. *Trends in Cognitive Science* **15**: 185-186
- Hemelrijk, C.K. & Hildenbrandt, H. 2011. Some causes of the variable shape of flocks of birds. *PLoS ONE* **6**: e22479
- Isaksson, I., While, G.M., McEvoy, J., van de Crommenacker, J., Olsson, M., Groothuis, T.G.G., Komdeur, J. & Wapstra, E. 2011. Aggression, but not testosterone, is associated to oxidative status in a free-living vertebrate. *Behaviour* **148**: 713-731
- Isaksson, I., While, G.M., Olsson, M., Komdeur, J. & Wapstra, E. 2011. Oxidative stress physiology in relation to life history traits of a free-living vertebrate: The Spotted Snow Skink, *Niveoscincus ocellatus*. *Integrative Zoology* **6**: 140-149
- Michler, S.P.M., Nicolaus, M., Ubels, R., van der Velde, M., Both, C., Tinbergen, J.M. & Komdeur, J. 2011. Do sex-specific densities affect local survival of free-ranging great tits? *Behavioral Ecology* **22**: 869-879
- Michler, S.P.M., Nicolaus, M., Ubels, R., van der Velde, M., Komdeur, J., Both, C. & Tinbergen, J.M. 2011. Sex-specific effects of the local social environment on juvenile post-fledging dispersal in great tits. *Behavioral Ecology and Sociobiology* **65**: 1975-1986
- Moskát, S., Rosendaal, E.C., Boers, M., Zölei, A., Bán, M. & Komdeur, J. 2011. Post-ejection nest-desertion of Common Cuckoo hosts: A second defense mechanism of avoiding reduced reproductive success? *Behavioral Ecology and Sociobiology* **65**: 1045-1053

- Procaccini, A., Orlandi, A., Cavagna, A., Giardina, I., Zoratto, F., Santucci, D., Chiarotti, F., Hemelrijk, C.K., Alleva, E., Parisi, G & Carere, C. 2011. Propagating waves in starling, *Sturnus vulgaris*, flocks under predation. *Animal Behaviour* **82**: 759-765
- Radersma, R., Tinbergen, J.M. & Komdeur, J. 2011. Do brood sex ratio, nestling development and sex affect fledging timing and order? An experimental study on Great Tits. *Animal Behaviour* **81**: 69-75
- Schut, E., Rivero-de Aguilar, J., Merino, S., Magrath, M.J.L., Komdeur, J. & Westerdahl, H. 2011. Characterization of MHC-I in the Blue Tit (*Cyanistes caeruleus*) reveals low levels of genetic diversity and trans-population evolution across European populations. *Immunogenetics* **63**: 531-542
- Trierweiler, C. & Hegemann, A. 2011. Food intake in a Montagu's harrier estimated by two methods of pellet analysis. *Journal of Raptor Research* **45**: 184-188
- van de Crommenacker, J., Komdeur, J., Burke, T. & Richardson, D.S. 2011. Spatio-temporal variation in territory quality and oxidative status: a natural experiment in the Seychelles Warbler (*Acrocephalus sechellensis*). *Journal of Animal Ecology* **80**: 668-680
- van de Crommenacker, J., Komdeur, J. & Richardson, D.S. 2011. Assessing the cost of helping: The roles of body condition and oxidative balance in the Seychelles Warbler (*Acrocephalus sechellensis*). *PLoS ONE* **6**: e26423
- van der Vaart, E., Verbrugge, R. & Hemelrijk, C.K. 2011. Corvid caching: Insights from a cognitive model. *Journal of Experimental Psychology: Animal Behavior Processes* **37**: 330-340
- Vedder, O., Komdeur, J., van der Velde, M., Schut, E. & Magrath, M.J.L. 2011. Polygyny and extra-pair paternity enhance the opportunity for sexual selection in Blue Tits. *Behavioral Ecology and Sociobiology* **65**: 741-752

Professional Publications

- Trierweiler, C. & Exo, K.-M. 2011. Lebensraumanalyse von Wiesenweihen-Jungvögeln mit Hilfe der Satellitentelemetrie. *Abschlußbericht DBU-Projekt 26663-33/2 26663-33/2*, 2008-2011. Institut für Vogelforschung "Vogelwarte Helgoland", Wilhelmshaven

Books & Book Chapters

- Hemelrijk, C.K. 2011. Simple reactions to nearby neighbours and complex social behaviour in primates. In: Menzel R. & Fischer J. (eds) *Animal thinking: Contemporary issues in comparative cognition*, pp. 223-238. *Strüngmann Forum Report* **8**, MIT Press, Cambridge, MA
- Jensen, K., Silk, J.B., Andrews, K., Bshary, R., Cheney, D.L., Emery, N., Hemelrijk, C.K., Holekamp, K., Penn, D.C., Perner, J. & Teufel, C. 2011. Social knowledge. In: Menzel R. & Fischer J. (eds) *Animal thinking: Contemporary issues in comparative cognition*, pp. 267-291. *Strüngmann Forum Report* **8**, MIT Press, Cambridge, MA

Magazine Publications

Kouwen, M. 2011. Te veel stress voorkomt helpende hand (Review of: van de Crommenacker et al. (2011), *PLoS ONE*). *Bionieuws* **21**: 4

Dissertations

Radersma, R. 2011. The ecological and evolutionary consequences of brood sex ratio variation. PhD thesis. Promotores: Prof. dr. ir. J. Komdeur, Prof. dr. J.M. Tinbergen. University of Groningen, The Netherlands

Reid, D.A.P. 2011. Modelling the hydrodynamics of swimming fish, from individuals to infinite schools. PhD thesis. Promotor: Prof. dr. C.K. Hemelrijk. University of Groningen, The Netherlands

van de Crommenacker, J. 2011. Hard times in paradise? - Oxidative status, physiology and fitness in the tropical Seychelles warbler. PhD thesis. Promotor: Prof. dr. ir. J. Komdeur. University of Groningen, The Netherlands

Vedder, O.H. 2011. All's fair in love and war - Reproductive strategies, intra-specific competition and sexual selection in blue tits. PhD thesis. Promotor: Prof. dr. ir. J. Komdeur. University of Groningen, The Netherlands

Community and Conservation Ecology

<http://www.rug.nl/research/community-and-conservation-ecology/>

Group leader Prof. dr. H. Olf

Composition of the group in 2011:

| Tenured Staff | source | fte | period |
|---|-------------------------|------------|-------------------------|
| Prof. dr. J.P. Bakker | Emeritus | | |
| Dr. R.S. Etienne | RUG/NWO-ALW Vidi | 1.0 | |
| Prof. dr. H. Olf | RUG | 1.0 | |
| Dr. ir. C. Smit | RUG | 1.0 | |
| Post-docs | | | |
| Ir. T. van der Heide | NWO/ALW | 1.0 | 01-03-2009 – 22-02-2015 |
| Dr. E.J. Weerman | NWO/ALW | 1.0 | 15-05-2010 – 14-05-2012 |
| PhD students | | | |
| Drs. N.D.P. Bhola | Bursaal FWN | 1.0 | 01-09-2007 – 01-09-2011 |
| Drs. V. Cordlandwehr MSc | NWO/ALW | 0.8 | 01-06-2007 – 14-07-2011 |
| Drs. X. Du | Chinese beurs | 1.0 | 01-09-2008 – 01-09-2012 |
| Drs. K. Elschot | OIO-NWO-ALW | 1.0 | 01-10-2008 – 30-09-2012 |
| Drs. F.A. Encinas Viso | Bursaal VIDI Etienne | 1.0 | 01-10-2008 – 01-10-2012 |
| Drs. W. Fokkema | Metwad, Waddenfonds | 1.0 | 01-09-2011 – 31-08-2015 |
| Drs. R.A. Howison | RUG | 1.0 | 01-04-2011 – 01-04-2015 |
| Drs. T. Janzen | Bursaal FWN | 1.0 | 06-09-2010 – 05-09-2014 |
| Drs. ir. R. van Klink | Vrom Waddenfonds | 1.0 | 01-01-2009 – 01-01-2013 |
| Drs. E.C. Koppenaal | Bursaal NAM | 1.0 | 01-11-2008 – 01-11-2012 |
| Drs. F. Mandema | Vrom Waddenfonds | 1.0 | 01-01-2009 – 01-01-2013 |
| Drs. S. Nolte | Vrom Waddenfonds | 1.0 | 01-01-2009 – 01-01-2013 |
| Drs. A. Ordoñez-Gloria | Bursaal | 1.0 | 01-09-2007 – 01-09-2011 |
| Drs. A.L.D. van der Plas | Bursaal (Pionier) | 1.0 | 01-04-2009 – 01-04-2013 |
| Drs. J.L. Ruifrok | Bursaal SBB | 1.0 | 01-10-2008 – 01-10-2012 |
| Drs. M.J.J. Schrama | Bursaal (Pionier) | 1.0 | 15-11-2007 – 15-11-2011 |
| Drs. G.F. Veen | V.d.Leeuw/NWO (Pionier) | 0.8 | 01-04-2005 – 08-04-2011 |
| Drs. E. van Velzen | Bursaal | 1.0 | 01-01-2009 – 01-01-2013 |
| Technical and Administrative staff | | | |
| <i>Secretary</i> | | | |
| I.C. Jansen | RUG | 0.5 | |
| <i>Chemical analist</i> | | | |
| N.D. Eck | RUG | 1.0 | |
| <i>Botanical analist</i> | | | |
| J.J. Hogendorf | RUG | 1.0 | |
| Y. de Vries | RUG | 0.5 | 01-02-1973 – 01-10-2011 |
| <i>IT-assistent</i> | | | |
| Ing. G.J. van den Burg | RUG | 0.8 | |

Guests

| | |
|-----------------------------|-------------------------------------|
| Prof. dr. J. van Andel | Groningen, NL |
| Prof. dr. M. Bertness | Brown University, USA |
| Prof. dr. E. van der Maarel | Groningen, NL |
| Prof. dr. K. Prach | Univ. South Bohemia, Czech Republic |
| J.M. Drees | Groningen, NL |
| R.M. Bekker | Groningen, NL |
| P. Esselink | Groningen, NL |
| J. Carnicer | Univ. Barcelona, Spain |
| R.M. Veeneklaas | Groningen NL |
| Dr. F. Vera | NL |

Publications 2011

Publications in journals

- Bockelmann, A.C., Wels, T. & Bakker, J.P. (2011). Seed origin determines the range expansion of the clonal grass *Elymus athericus*. *Basic and Applied Ecology* 12: 496-504.
- Bos, D. & Ydenberg, R. (2011). Evaluation of alternative management strategies of Muskrat *Ondatra zibethicus* population control using a population model. *Wildlife Biology* 17: 143-155.
- Christianen, M.J.A., van der Heide, T., Bouma, T.J., Roelofs, J.G.M., van Katwijk, M.M. & Lamers, L.P.M. (2011). Limited toxicity of NH_x pulses on an early and late successional tropical seagrass species: Interactions with pH and light level. *Aquatic Toxicology* 104: 73-79
- De Groot, A.V., Veeneklaas, R.M. & Bakker, J.P. (2011). Sand in the salt marsh: Contribution of high-energy conditions to salt-marsh accretion. *Marine Geology* 282:240-254.
- De Groot, A.V., Veeneklaas, R.M., Kuijper, D.P.J. & Bakker, J.P. (2011). Spatial patterns in accretion on barrier-island salt marshes. *Geomorphology* 134: 280-296.
- De Visser, S.N., Freymann, B.P. & Olf, H. (2011) The Serengeti food web: empirical quantification and analysis of topological changes under increasing human impact. *Journal of Animal Ecology*, 80: 484-494.
- Du, X., Zhou, S. & Etienne, R.S. (2011). Negative density dependence can offset the effect of species competitive asymmetry: a niche-based mechanism for neutral-like patterns. *Journal of Theoretical Biology* 278: 127–134.
- Etienne, R.S. & Haegeman, B. (2011).The neutral theory of biodiversity with random fission speciation. *Theoretical Ecology* 4: 87–109.
- Etienne, R.S. & Rosindell, J. (2011). The spatial limitations of current neutral models of biodiversity. *PLoS One* 6: e14717.
- Haegeman, B. & Etienne, R.S.(2011). Independent species in independent niches behave neutrally. *Oikos* 120: 961-963.
- Hawley, D.M., Etienne, R.S., Ezenwa, V.O. & Jolles, A.E. (2011). Does animal behavior underlie covariation between hosts' exposure to infectious agents and susceptibility to infection? Implications for disease dynamics. *Integrative and Comparative Biology* 51: 528-539.
- Hopcraft, J.G.C., Anderson, T. M., Perez Vila, S., Mayemba, E. & Olf, H.. (2011). Body size and the division of niche space: Food and predation differentially shape the distribution of Serengeti grazers. *Journal of Animal Ecology*
- Rosindell, J., Hubbell, S.P. & Etienne, R.S.(2011).The unified neutral theory of biodiversity and biogeography at age ten. *Trends in Ecology & Evolution* 26: 340-348.
- Scheper, J. & Smit, C.(2011). The role of rodents in seed fate of a spiny shrub in an ancient wood pasture. *ActaOecologica* 37: 133-139.
- Smit, C. & Ruifrok, J. L. (2011).From protégé to nurse plant: establishment of thorny shrubs in grazed woodlands. *Journal of Vegetation Science*: 22: 377-386.
- Smit, C. & Verwijmeren, M.(2011). Tree-shrub associations in grazed woodlands: first rodents, then cattle? *Plant Ecology*, 212:483-493.
- Van der Heide, T., van der Zee, E., Donadi, S., Eklof, J.S., Eriksson, B.K., Piersma, T., Olf, H. & van der Heide, W. (2011). A simple and low-cost method to estimate spatial positions of shorebirds: the Telescope-Mounted Angulator. *Journal of Field Ornithology* 82: 80-87

- Veeneklaas, R.M., Bockelmann, A.C., Reusch, T.B.H. & Bakker, J.P. (2011). Effect of grazing and mowing on the clonal structure of *Elytrigia atherica*: a long-term study of abandoned and managed sites. *Preslia* 83: 455-470.
- Verhulst, J., Loonen, F., Berendse, W., Klein, D. & Smit, C. (2011). Spatial distributions of meadow birds throughout the breeding season – relations to in-field heterogeneity and management. *Agriculture, Ecosystems and Environment* 142: 161-166.

Books/chapter in books

- Díaz, M., Alonso, C.L., Arroyo, L., Bonal, R., Muñoz, A., Smit, C., (2011). Desarrollo de un protocolo de seguimiento a largo plazo de los organismos clave para el funcionamiento de los bosques mediterráneos. In: *Ramírez, L. (Ed.), Proyectos de investigación en parques nacionales 2007-2010, Madrid*
- Smit, C. & Putman, R., (2011). Large herbivores as 'Environmental Engineers'. In: *Ungulate Management in Europe; Problems and Practices*. Eds: M. Appolonio, R. Andersen and R. Putman.
- Van der Maarel, E., Sterk, A.A., Lensink, B.M. & Freijssen, A.H.J. (2011). De Stichting Wetenschappelijk Duinonderzoek. *Het Nederlands duinonderzoek in historisch en internationaal perspectief*. KNNV Uitgeverij, Zeist, 272 pp.

Professional publications

- Bakker, J.P. & De Vries, Y. (2011). Bemesting op de kwelder. *De Levende Natuur* 112: 102-105.
- Bakker, J.P., Bouma, T.J., De Groot, A.V., De Meijer, R.J., Herman, P.M.J., Van de Koppel, J., Van der Graaf, E.R. & Van Wesenbeeck, B.K. (2011). Mechanisms involved in salt-marsh rejuvenation. In: Heip, C. & Laane, R. (eds). *Aspects of coastal research in contribution to LOICZ in the Netherlands and Flanders (2002-2010)*. LOICZ Research & Studies No. 38, pp. 70-82. Helmholtz-Zentrum Geesthacht, 184 pp.
- Bakker, J.P., De Vries, Y. & Smit, C. (2011). Het onverwacht ontstaan van een parkachtig landschap. *De Levende Natuur* 112:185-190.
- Bakker, J.P., Knevel, I.C. & Van der Windt, H.J. (2011). De Levende Natuur 110 jaar: van Heimans en Thijssse tot DVD. *De Levende Natuur* 112:230-234.
- Drees, M., Stolz, T. & Smit, C. (2011). Konijn en Jeneverbes. *De Levende Natuur*: 112, 174-177
- Haafkens, L. & van der Maarel, E. (2011). Heimans Symposium 10 december 2011. Een biologisch en ethisch reveil: De erfenis van Eli Heimans nu. *Heimans en Thijssse Nieuwsbrief* 41 2-3.
- Seligman, N.G., van der Maarel, E. & Díaz, S. (2011). Imanuel Noy-Meir – the Ecologist and the Man. *Israel Journal of Ecology and Evolution* 57: 5-16.

Dissertations

- De Visser, S.N. (2011) Community and foodweb structure of an African savanna: consequences of alternative land use practices. PhD thesis, University of Groningen, The Netherlands
- Kanga, E. M. (2011) The Kenyan Hippo. PhD thesis, University of Groningen, The Netherlands
- Ordoñez Gloria, A. (2011) Understanding Plant Invasions. PhD thesis, University of Groningen, The Netherlands

Veen, G.F. (2011) Living Apart Together. PhD thesis, University of Groningen, The Netherlands

ECOPHYSIOLOGY OF PLANTS

<http://www.rug.nl/research/plant-ecophysiology/>

Group leader Prof. dr. J.T.M. Elzenga

Composition of the group in 2011:

| Tenured Staff | source | fte | period |
|---------------------------------------|-----------------------------|------------|-------------------------|
| Prof. dr. J.T.M. Elzenga | RUG | 1.0 | |
| Dr. L.J. de Kok | RUG | 1.0 | |
| Postdocs | | | |
| Dr. W. Patberg | TCNN | 0.6 | 01-08-2011 – 01-11-2011 |
| Dr. J. Stefels | NWO/RUG | 0.8 | 01-01-2010 – 31-12-2012 |
| Dr. N. Sujeeth | EU-FP7 | 1.0 | 01-04-2010 – 01-04-2013 |
| Dr. M.A. van Leeuwe | NWO | 0.6 | 01-02-2011 – 31-12-2012 |
| Dr. J.H. Venema | EL&I | 0.8 | 01-04-2010 – 01-04-2014 |
| PhD Students | | | |
| Drs. T. Aghajanzadeh | Razi Med. Diag. Lab. | 1.0 | 01-11-2010 – 01-11-2014 |
| Drs. C. Fritz | St Peat Research | 1.0 | 01-01-2007 – 01-07-2011 |
| Drs. I.A. Neven | NWO-ALW | 1.0 | 15-02-2006 – 15-01-2011 |
| Drs. M. Reich | EC-Fellow, BIONUT/ITN | 1.0 | 01-07-2011 – 01-07-2015 |
| Drs. M. Shahbaz | NUFFIC bursary | 1.0 | 01-09-2007 – 01-09-2011 |
| Drs. J. Spoelder | HLB Laboratory | 1.0 | 01-01-2011 – 01-01-2015 |
| Drs. N. Yu | Chinese Scholarship Council | 1.0 | 01-09-2011 – 01-09-2015 |
| Drs. F. Zaki Mostafa Ali | Egyptian Government | 1.0 | 01-02-2007 – 01-02-2011 |
| Technical/Administrative Staff | | | |
| <i>Secretary</i> | | | |
| J. Nuijten-Tjalkes | RUG | 0.4 | |
| <i>Research analyst</i> | | | |
| F.S. Posthumus | RUG | 1.0 | |
| M. Staal | RUG | 1.0 | |
| C.E.E. Stuiver | RUG | 0.7 | |
| <i>Administrator</i> | | | |
| G.P. Telkamp | RUG | 1.0 | |
| | | | 0.4 from 01-12-2011 |

Introduction

Movement of water, nutrients and organic compounds in and out of plants or algae, between plant organs and between the cell wall compartment and the cytoplasm of a cell, are processes that define the functioning of an organism. The affinity of the uptake system for a limiting nutrient from the soil determines the outcome of the competition between species; the signalling molecules released by the roots shape the composition of the microbial community around the roots and facilitate the establishment of the symbiosis with beneficial bacteria and with mycorrhizal fungi; pathogenic bacteria trigger ion movements across the cell membrane, involved in the anti-bacterial response of the plant determining the susceptibility of a plant to the pathogen, the release of organic sulfur compounds by algae affect temperature on a global scale. With modern biophysical techniques the fluxes of organic compounds and ions can be quantified. The Ecophysiology of Plants group develops new techniques that enable us to measure with higher precision the fluxes of nutrient ions and climate active compounds, on physiological and ecological relevant scales. Although the measurements are sometimes carried out on a scale as small as a single vacuole or a root tip, or involve samples collected during an expedition to Antarctica, the main goal always remains to understand the functioning of the whole organism in its, often variable, environment.

Plants are capable to respond to changes in their environment by changing growth pattern, adjust their physiology, resorb and form roots, accumulate defensive compounds or osmotically active, compatible solutes. This adaptive behaviour of algae and plants in turn can affect their environment, sometimes on a global scale.

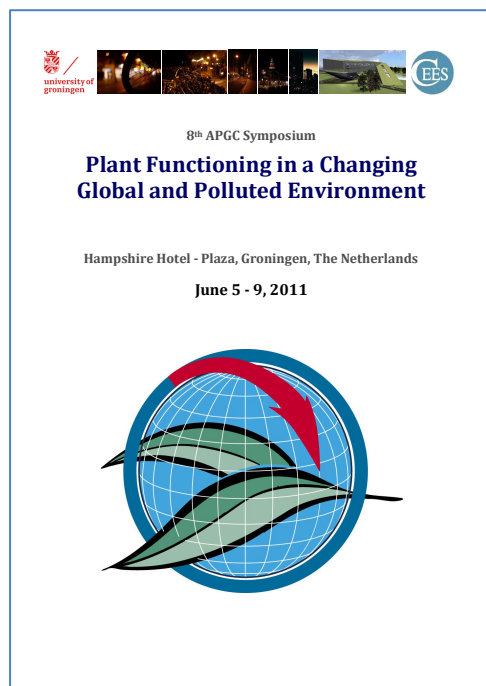
Our approach, using advanced biophysical techniques to measure processes that are essential to plant functioning in a changing environment, and interpreting these in a whole plant context, is applied in two areas of interest:

1. Determining the interaction between global change factors and plant/algal performance: DMS release by algae, the effect of CO₂ levels on Sphagnum growth and algal photosynthesis, and the effect of atmospheric sulfur compounds on plant performance. In these projects effects of climate change and changes in the atmospheric composition on ecologically important processes are studied. Changes in plant growth due to increased CO₂ levels and the effects of atmospheric sulfur and nitrogen compounds on plant nutrient demand are themes that have a long history in the Plant Ecophysiology group. DMS is one of the so-called negative greenhouse gasses: it can function as a condensation nucleus, inducing cloud formation that has a cooling effect on a global scale. The production, release and subsequent hydrolysis of DMSP by algae, is the main source of DMS. The conditions that stimulate or inhibit the production of DMSP are, however, still not fully understood. Since Sphagnum bogs are the only terrestrial ecosystem that can function as a carbon-sink over

geological periods, the establishment and/or restoration of these bogs can ameliorate the CO₂ production due to burning of fossil fuel.

2. Describing, understanding and possibly optimizing the acclimative characteristics of plants to suit the changing requirements of growing crop plants. Examples of such projects are: plant performance under suboptimal temperature, mechanisms of salt-tolerance in maize, molecular basis of root architecture and uptake characteristics, and effects of plant-microbe interaction on plant physiology and development. These projects are characterized by a strong interest of commercial partners. By focussing the physiological research on commercial crop plants the combination of challenging scientific questions and practice-oriented solutions has proved to be inspiring and productive.

HIGHLIGHTS ECOPHYSIOLOGY OF PLANTS IN 2011



The 8th Air Pollution Global Change Symposium entitled "**Plant Functioning in a Changing Global and Polluted Environment**" has been held in Hampshire Hotel - Plaza, Groningen, The Netherlands from June 5 - 9, 2011. The Symposium was organized by Dr. Luit J. De Kok, Prof. dr. J. Theo M. Elzenga and Dr. Jacqueline Stefels. 70 scientists from 21 different countries participated in the symposium. A selection of the invited and contributed papers will be published in a Special Issue of *Environmental and Experimental Botany*.



BIONUT-ITN 2011-2015

The Marie Curie Initial Training Network "**Biochemical and Genetic Dissection of Control of Plant Mineral Nutrition (BIONUT-ITN; www.bionut-itn.eu)**" started officially in January 2011. The BIONUT-ITN is consortium of 9 European partners including the research group of Dr. Luit J. De Kok. The major objective of BIONUT-ITN is to provide state-of-the-art training

for young researchers in the highly strategic field of plant nutrition through an international programme of research, training and transfer of knowledge. The training will include state of the art biochemical and genetic technology in the laboratory and field agronomy and high throughput phenotyping technologies. The training will be based around a research project, which will address important biological questions using model plants and major crop species with the overall goal of increasing the understanding of nutrient use efficiency of plants. The overarching and long-term scientific questions of BIONUT-ITN are thus: what controls nutrient use efficiency of plants and how can we use this to generate crop plants with optimized yields without increasing inputs? Since most of the current knowledge was achieved by focusing on single mineral nutrients and either models or crops a new integrated approach is essential to moving the field forward. In particular, the potential target genes have to be analyzed simultaneously in models and crops; furthermore the coordination of assimilation of major nutrients has to be taken into account. BIONUT-ITN addresses this by bringing together a group of world-class researchers to adopt a multidisciplinary approach and to provide the necessary breadth of expertise essential to training and transfer of knowledge. The advances that are anticipated (technological and knowledge based) are likely to lead to industrial applications in the medium to long term, requiring the inclusion of a business perspective. BIONUT-ITN incorporates industrial partners from technological and intellectual property backgrounds and, as such, contributes to the European Research Area's objectives by strengthening EU competitiveness. BIONUT-ITN will lead developments that are crucial to advancing biology of plant nutrition, and the 9 young researchers trained will be uniquely positioned to become world leaders in this strategic field. The young researchers trained in BIONUT-ITN will learn state-of-the-art-techniques in forward and reverse genetics, biochemistry and plant physiology, but will also have an opportunity to participate in crop field trials. They will obtain training from industrial partners, thereby enhancing intersectoral mobility, especially with core skills relevant to the biotechnology industries (e.g., agbiotech, biofuels industry etc). By bringing complementary intersectoral providers of research training together into a cohesive network, Bionut-ITN will move the biologists working in the field of plant nutrition closer to the end-users of the research achievements, the agroindustry, the breeders and the farmers.



The research program Green Breeding was started officially on November 17th 2011 with a kick-off meeting at Enza Seeds Enkhuizen, with representatives of the *Ministry* of Economic Affairs, Agriculture and Innovation (*EL&I*), researchers and breeders. During this meeting, with presentations of all four incorporated projects, the research program leaflet

(<http://www.louisbolk.org/downloads/2521.pdf>) was delivered to the Ministry of EL&I by the program managers. Green Breeding is a collaboration of Wageningen University, University of Groningen, the Louis Bolk Institute and several private breeding companies. The aim is to develop robust crops, which are more resistant against abiotic and biotic stresses. Such crops may improve the durability of the agricultural and horticultural sector. This cooperation between private and public researchers guarantees an efficient incorporation of knowledge and results into breeding programs. The Plant Ecophysiology group of the University of Groningen is involved in Green Breeding with a project, which aims to deliver breeding companies with an efficient method for the selection of robust rootstocks for tomato. Dr. Jan Henk Venema presented his EL&I tomato rootstock research project as invited speaker at the International Symposium on Vegetable Grafting, University of Viterbo, Italy, October 3-5, 2011.



A new Polar project has been granted within NWO's New Polar Program: **Temporal dynamics of the climate gas dimethyl sulphide (DMS) and related compounds in a changing Antarctic sea-ice environment.** In this post-doc project Drs Jacqueline Stefels and Maria van Leeuwe will be working on year-round measurements of climate gases. The research will be done at the new Dutch

Science Facility of the British Antarctic Research Station "Rothera". The base is situated at the west-side of the Antarctic peninsula, where currently large effects of global warming are visible. Four laboratory containers will be built in the Netherlands and shipped to the base. One of these labs will be fully dedicated to this project. During two spring-summer seasons, 2 or 3 persons from our group will visit the base. They will perform incubation experiments with surface water samples and measure turnover rates of climate relevant compounds. An overwinterer will be instructed to take some of the basic parameters in order to obtain a year-round dataset.



A **COST Action** workshop on **"Sea-ice Biogeochemistry and Interactions with the Atmosphere"** was organized at the Royal Academy of Science in Amsterdam, the Netherlands (12-14 April) by Dr. J. Stefels. The workshop was attended by 23 representatives from 10 countries, including representatives from the US, Canada and Australia. During the three days major ongoing science

projects were discussed and future cooperation was secured with the formal establishment of a new international sea-ice community in which Stefels plays a leading role. One of the

first initiatives was to combine efforts with the Canada/US-based sea-ice community OASIS. Together a featured article was written for EOS (“Changing Polar Environments: Interdisciplinary Challenges”) and a new working group proposal submitted to the Scientific Committee for Oceanographic Research (SCOR).

Publications 2011

Publications in journals

- Bell TG, Malin G, Lee GA, Stefels J, Archer S, Steinke M and Matrai P 2011. Global DMS Data Inter-Comparability. *Biogeochemistry*. DOI: 10.1007/s10533-011-9662-3
- De Kok, L.J., Stulen, I. and Hawkesford, M.J. 2011. Sulfur nutrition in crop plants. In: The molecular basis of nutrient use efficiency in crops. Hawkesford, M.J and Barraclough, P. (eds.), Wiley-Blackwell, pp. 295-309. ISBN-13:978-0-8138-1992-1.
- Elzenga J.T.M, van Veen H., 2010: Waterlogging and plant nutrient uptake. In: Waterlogging Signalling and Tolerance in Plants. Mancuso S., Shabala S. (eds.) Springer-Verlag Berlin Heidelberg. DOI 10.1007/978-3-642-10305-6_2
- Hsieh, C.L., Yeh, K.W, De Kok, L.J., Pan R.N., Kuo, Y.H. and Tseng M.H. 2011. Simultaneous determination of sulphur metabolites in *Arabidopsis thaliana* via LC-ESI-MS/MS and ³⁴S-metabolic labelling. *Phytochem. Anal.* DOI 10.1002/pca.1361.
- Fritz C., van Dijk G., Smolders A.J.P., Pancotto V.A., Elzenga J.T.M., Roelofs J.G.M., Grootjans A.P., 2011. Nutrient additions in pristine Patagonian *Sphagnum* bog vegetation: can phosphorus addition alleviate (the effects of) increased nitrogen loads. *Plant Biology*. DOI: 10.1111/j.1438-8677.2011.00527.x
- Fritz C, Pancotto VA, Elzenga JTM *et al.* 2011. Zero methane emission bogs: extreme rhizosphere oxygenation by cushion plant in Patagonia. *New Phytologist*, **190**, 398–408.
- Lana A., TG Bell, R Simó, SM Vallina, J Ballabrera-Poy, AJ Kettle, J Dachs, L Bopp, ES Saltzman, J Stefels, JE Johnson, PS Liss (2011) An updated climatology of surface dimethylsulfide concentrations and emission fluxes in the global ocean. *Global Biogeochemical Cycles* 25, GB1004, doi:10.1029/2010GB003850
- Neven I, Stefels J, van Heuven S, de Baar HJW, Elzenga JTM, 2011. High adaptability in inorganic carbon uptake by Southern Ocean phytoplankton in response to ambient CO₂. *Deep Sea Research II*. doi:10.1016/j.dsr2.2011.03.006
- Staal M, De Cnodder T, Simon D, Vandenbussche F, Van Der Straeten D, Verbelen J-P, Elzenga JTM, Vissenberg K, 2011. Apoplastic alkalinization is instrumental for the inhibition of cell elongation in the *Arabidopsis* root by the ethylene precursor 1-aminocyclopropane-1- carboxylic acid. *Plant Physiology* **155**, 2049-2055
- Stefels J, Carnat G, Dacey JWH, Goossens T, Elzenga JTM, Tison J-L, 2011. The analysis of dimethylsulfide and dimethylsulphonioacetate in sea ice: dry-crushing and melting using stable isotope additions. *Marine Chemistry* doi:10.1016/j.marchem.2011.09.007
- Venema J.H., Elzenga J.T.M., Bouwmeester H.J. 2011. Selection and breeding of robust rootstocks as a tool to improve nutrient-use efficiency and abiotic stress tolerance in

tomato. In: Proc. First IC on Organic Greenhouse Hort. Dorais M., Bishop S.D. (eds.), *Acta Hort.* 915

Warmink J.A., Nazir R., Corten B., van Elsas J.D., 2011. Hitchhikers on the fungal highway: The helper effect for bacterial migration via fungal hyphae. *Soil Biology & Biochemistry* 43:760-765

Dissertations

Zaki Mostafa Ali, Fatma. 2011. The Determinants of Salinity Tolerance in Maize (*Zea mays* L.) Promotor: prof.dr. J.T.M. Elzenga. Rijksuniversiteit Groningen. ISBN: 978-90-367-4876-6 (book). ISBN: 978-90-367-4877-3 (digital version).

Shahbaz, Muhammad. 2011. Copper toxicity and sulfur metabolism in *Chinese cabbage*. Promotor: prof.dr. J.T.M. Elzenga. Rijksuniversiteit Groningen. ISBN: 978-90-367-5094-3 (book). ISBN: 978-90-367-5093-6 (digital version)

Patberg, Wouter. 2011. Solute transport in *Spagnum* dominated bogs. The ecophysiological effects of mixing convective flow. Promotores, prof.dr. J.T.E. Elzenga & prof.dr. A.P. Grootjans, Rijksuniversiteit Groningen. ISBN: 978-90-367-5241-1 (book), ISBN: 978-90-367-5242-8 (digital version).

Evolutionary Genetics

<http://www.rug.nl/research/evolutionary-genetics/>

Group leader Prof. dr. L.W. Beukeboom

Composition of the group in 2011:

| Tenured Staff | source | fte | period |
|---|---|------------|-------------------------|
| Prof. dr. L.W. Beukeboom | RUG | 1.0 | |
| Dr. L.P.W.G.M. van de Zande | RUG | 1.0 | |
| Dr. B. Wertheim | Rosalind Franklin NWO-ALW VIDI | 1.0 | 01-01-2009 – 01-01-2015 |
| Post-docs | | | |
| Dr. J.G. de Boer | NWO-ALW VENI | 0.8 | 01-10-2007 – 01-08-2011 |
| Dr. B.A. Pannebakker | NWO-ALW VENI, RUG | 1.0 | 15-09-2008 – 15-09-2011 |
| Dr. T. Schwander | NWO-ALW VENI | 1.0 | 01-02-2010 – 01-02-2013 |
| Dr. E.C. Verhulst | NWO | 1.0 | 12-07-2010 – 12-07-2013 |
| Dr. C.J. Vermeulen | RUG | 0.4 | 15-08-2009 – 15-08-2014 |
| PhD-students | | | |
| Drs. W. Diao | RUG-Marie Curie | 1.0 | 01-01-2009 – 01-01-2013 |
| Drs. S. Gerritsma | RUG-VENI | 1.0 | 06-07-2009 – 06-07-2013 |
| Drs. E. Geuverink | NWO-TOP | 1.0 | 01-09-2010 – 01-09-2014 |
| Drs. M.C.W.G. Giesbers | NWO-ALW | 1.0 | 01-09-2008 – 01-09-2012 |
| Drs. K.M. Jalvingh | RUG bursary | 1.0 | 01-02-2008 – 30-09-2012 |
| Drs. T. Koevoets | NWO-ALW | 1.0 | 01-09-2006 – 01-07-2011 |
| Drs. W.J. Ma | UE bursary | 1.0 | 01-10-2009 – 01-10-2013 |
| Drs. K. Meijer | Uytenboogaart-Eliassen, Naturalis, RUG FWN bursary | 1.0 | 15-07-2008 – 30-09-2012 |
| Drs. S. Paolucci | RUG-Marie Curie | 1.0 | 01-11-2008 – 01-11-2012 |
| Drs. S. Perez Vila | RUG bursary | 1.0 | 01-02-2007 – 01-08-2011 |
| Drs. L. Salazar Jaramillo | RUG Rosalind Franklin bursary | 1.0 | 01-02-2009 – 01-02-2013 |
| Technical and Administrative Staff | | | |
| <i>Secretary</i> | | | |
| E.E.J. Plender-Hartman | RUG | 0.4 | |
| <i>Technicians</i> | | | |
| S. Ferber | RUG | 0.5 | 15-08-2010 – 15-08-2011 |
| A. de Haan | RUG | 1.0 | 01-10-2009 – 15-09-2013 |
| P.J. Hes | RUG | 0.4 | |
| R.S.S. Houwerzijl | RUG | 1.0 | |
| A.H. Rensink | RUG | 1.0 | |
| A. Rumahloine | DSW | 1.0 | |
| Adjunct Chair | | | |
| Prof. dr. M. Schilthuizen | Naturalis | | |

Introduction

The *Evolutionary Genetics Group* investigates genetic and life-history traits of organisms from an evolutionary perspective. We ask how population structure and genetic variation affect and, in turn, are shaped by, evolutionary and ecological processes. Research focus is on the genetics and evolution of reproductive systems and life histories, genetics of speciation, genetics and genomics of host-parasitoid interactions, and the genetics and evolutionary ecology of biodiversity. We put special emphasis on the integration of theoretical approaches and experimental testing of models.

Our research is aimed at unravelling the genetic regulation of reproductive systems and at understanding how reproductive modes shape mating systems and life-history characteristics. The main focus is on haplodiploidy in insects, which combines parthenogenetic and sexual reproduction, as well as differences in ploidy level of males and females. We also study genomic, genetic and ecological adaptations in parasite host-interactions. Our molecular approach includes the development of molecular markers for population structure analysis and genome mapping, the identification and structural analysis of genes and their regulatory regions and expression profiling. Our study organisms are parasitoid wasps (*Nasonia*, *Asobara*, *Cotesia*), flies (*Drosophila*, *Musca*) and stick insects (*Timema*).

Our main research themes are: (1) Genetics and evolution of sex determining mechanisms; (2) Genetics and evolution of reproductive isolation; (3) Genetics, ecology and evolution of life-history traits and reproductive strategies; (4) Genomics of host-parasitoid interactions; and (5) Evolutionary and ecological drivers of biodiversity. Below we present our highlights, as well as several projects that showcase the diversity of our research.

Highlights of Evolutionary Genetics

2011 was a good year for Evolutionary Genetics. In January Eveline Verhulst defended her thesis on sex determination in *Nasonia* with distinction *cum laude* based on, among others, two publications in *Science*. Leo Beukeboom received a grant of the Requête Fondation Herbette for a pre-sabbatical stay at the Department of Ecology and Evolution at the University of Lausanne. Together with host Prof. N. Perrin they wrote an outline of their planned book on the evolution of sex determining mechanisms, which was favourably reviewed and accepted by Oxford University Press. The collaboration with Prof Menno Schilthuizen, who holds the Uyttenboogaart-Eliassen Foundation funded chair in insect biodiversity, resulted in the publication of a mini-review in *Heredity* on the occurrence of Haldane's Rule in speciation. Laura Ross, who had been a combined PhD student with Theoretical Biology, received the 2011 price of the Netherlands Entomological Society for the best PhD thesis and gave her price winning talk at the yearly Entomology Day.

Publications 2011

Publications in journals

Abbot, P., Abe, J., Alcock, J., Alizon, S., Alpedrinha, J.A., Andersson, M., Andre, J.B., van Baalen, M., Balloux, F., Balshine, S., Barton, N., Beukeboom, L.W., Biernaskie, J.M., Bilde, T., Borgia, G., Breed, M., Brown, S., Bshary, R., Buckling, A., Burley, N.T., Burton-Chellew,

- M.N., Cant, M.A., Chapuisat, M., Charnov, E.L., Clutton-Brock, T., Cockburn, A., Cole, B.J., Colegrave, N., Cosmides, L., Couzin, I.D., Coyne, J.A., Creel, S., Crespi, B., Curry, R.L., Dall, S.R., Day, T., Dickinson, J.L., Dugatkin, L.A., El Mouden, C., Emlen, S.T., Evans, J., Ferriere, R., Field, J., Foitzik, S., Foster, K., Foster, W.A., Fox, C.W., Gadau, J., Gandon, S., Gardner, A., Gardner, M.G., Getty, T., Goodisman, M.A., Grafen, A., Grosberg, R., Grozinger, C.M., Gouyon, P.H., Gwynne, D., Harvey, P.H., Hatchwell, B.J., Heinze, J., Helanterä, H., Helms, K.R., Hill, K., Jiricny, N., Johnstone, R.A., Kacelnik, A., Kiers, E.T., Kokko, H., Komdeur, J., Korb, J., Kronauer, D., Kummerli, R., Lehmann, L., Linksvayer, T.A., Lion, S., Lyon, B., Marshall, J.A., McElreath, R., Michalakis, Y., Michod, R.E., Mock, D., Monnin, T., Montgomerie, R., Moore, A.J., Mueller, U.G., Noe, R., Okasha, S., Pamilo, P., Parker, G.A., Pedersen, J.S., Pen, I., Pfennig, D., Queller, D.C., Rankin, D.J., Reece, S.E., Reeve, H.K., Reuter, M., Roberts, G., Robson, S.K., Roze, D., Rousset, F., Rueppell, O., Sachs, J.L., Santorelli, L., Schmid-Hempel, P., Schwarz, M.P., Scott-Phillips, T., Shellmann-Sherman, J., Sherman, P.W., Shuker, D.M., Smith, J., Spagna, J.C., Strassmann, B., Suarez, A.V., Sundstrom, L., Taborsky, M., Taylor, P., Thompson, G., Tooby, J., Tsutsui, N.D., Tsuji, K., Turillazzi, S., Ubeda, F., Vargo, E.L., Voelkl, B., Wenseleers, T., West, S.A., West-Eberhard, M.J., Westneat, D.F., Wiernasz, D.C., Wild, G., Wrangham, R., Young, A.J., Zeh, D.W., Zeh, J.A. and Zink, A. (2011) Inclusive fitness theory and eusociality. *Nature* 471, E1-4; author reply E9-10.
- Libbrecht, R., Schwander, T. and Keller, L. (2011) Genetic components to caste allocation in a multiple-queen ant species. *Evolution* 65, 2907-2915.
- Neiman, M. and Schwander, T. (2011) Using parthenogenetic lineages to identify advantages of sex. *Evolutionary Biology* 38, 115-123.
- Pannebakker, B.A., Watt, R., Knott, S.A., West, S.A. and Shuker, D.M. (2011) The quantitative genetic basis of sex ratio variation in *Nasonia vitripennis*: a QTL study. *J. Evol. Biol.* 24, 12-22.
- Ross, L., Dealey, E.J. and Beukeboom, L.W. (2011) Temperature, age of mating and starvation determine the role of maternal effects on sex allocation in the mealybug *Planococcus citri*. *Behav. Ecol. Sociobiol.* 65, 909-919.
- Schilthuizen, M., Giesbers, M.C. and Beukeboom, L.W. (2011) Haldane's rule in the 21st century. *Heredity* 107, 95-102.
- Schwander, T. and Beukeboom, L.W. (2011) Non-random autosome segregation: a stepping stone for the evolution of sex chromosome complexes? Sex-biased transmission of autosomes could facilitate the spread of antagonistic alleles, and generate sex-chromosome systems with multiple X or Y chromosomes. *Bioessays* 33, 111-114.
- Schwander, T., Henry, L. and Crespi, B.J. (2011) Molecular evidence for ancient asexuality in timema stick insects. *Curr. Biol.* 21, 1129-1134.
- Schwander, T. and Leimar, O. (2011) Genes as leaders and followers in evolution. *Trends Ecol. Evol.* 26, 143-151.
- Wertheim, B., Kraaijeveld, A.R., Hopkins, M.G., Walther Boer, M. and Godfray, H.C. (2011) Functional genomics of the evolution of increased resistance to parasitism in *Drosophila*. *Mol. Ecol.* 20, 932-949.

Dissertations

- Verhulst, E.C. Genetic basis of sex determination in the haplodiploid wasp *Nasonia vitripennis*. Promotor Prof.dr. L.W. Beukeboom, University of Groningen.

Marine Benthic Ecology and Evolution (MarBEE)

<http://www.rug.nl/research/marine-benthic-ecology-and-evolution/>

Group leader Prof. dr. J.L Olsen

Composition of the group in 2011:

| Tenured staff | source | fte | period |
|---|----------------|------------|-------------------------|
| Prof.dr. J.L. Olsen | RUG | 1.0 | |
| Dr. B.D.H.K. Eriksson | RUG | 1.0 | |
| Prof.dr. W.T. Stam | RUG | Emeritus | |
| Post-docs | | | |
| Dr. M.K. de Boer | RUG | 0.8 | 01-11-2009 – 01-08-2013 |
| Dr. J.A. Coyer | NWO-ALW | 1.0 | 01-09-2009 – 01-09-2012 |
| PhD-students | | | |
| Drs. S. Donadi | NWO-ZKO | 1.0 | 01-03-2009 – 01-03-2013 |
| Drs. M. Poortvliet | RUG | 1.0 | 01-04-2008 – 01-04-2012 |
| Drs. S. Santos | NIOZ | 1.0 | 01-04-2007 – 01-04-2011 |
| Drs. K. Sieben | RUG | 1.0 | 01-06-2007 – 01-06-2011 |
| Technical and Administrative Staff | | | |
| SECRETARY | | | |
| H.G. TJOELKER | RUG-CEES | 0.5 | |
| TECHNICIANS | | | |
| S.A. Boele-Bos | RUG | 0.5 | |
| J.H.Veldsink | RUG | 1.0 | |
| Adjunct Chairs | | | |
| Prof. dr. C.H.R. Heip | NIOO-CEME/NIOZ | | |

Introduction

The theme of the Marine Benthic Ecology & Evolution group is “diversity in space and time”, which is spread over two broad work areas, each with several projects: 1) population genetics-genomics, hybrid zones, speciation and phylogeography (Olsen lead); and 2) experimental community ecology, focusing on factors that promote resilience in complex benthic communities (Eriksson lead). There is also a sub-programme related to invasive species (Olsen)). The group utilizes field and laboratory methods with emphasis on links between ecological and evolutionary processes. There is a strong emphasis on the development and use of molecular tools in combination with manipulative field experiments.

Publications 2011

Publications in journals

- Canovas, F., Mota, C., Ferreira-Costa, J., Serrão, E., Coyer, J., Olsen, J., and Pearson, G. 2011. Development and characterization of 35 single nucleotide polymorphism markers for the brown alga *Fucus vesiculosus* L. *European Journal of Phycology* 46, 342-351.
- Coyer, J.A., Hoarau, G., Costa, J.F., Hogerdijk, B., Serrão, E.A., Billard, E., Valero, M., Pearson, G., Olsen, J.L. 2011. Evolution and diversification within the intertidal brown macroalgae *Fucus spiralis*/*F. vesiculosus* species complex in the North Atlantic. *Molecular Phylogenetics and Evolution* 58: 283-296.
- Coyer, J.A., Hoarau, G., Pearson, G., Mota, C., Alpermann, T., John, U., Jüterbock, A. & Olsen, J.L. 2011. Genomic scans detect signatures of selection along a salinity gradient in populations of the intertidal seaweed *Fucus serratus* on a 10 km scale. *Marine Genomics* 4: 41-49.
- Coyer, J.A., Hoarau, G., Schaik, J. van, Luijckx, P. & Olsen, J.L. 2011. Trans-Pacific and trans-Arctic pathways of the intertidal macroalgal *Fucus distichus* reveal multiple glacial refugia and colonisations from the North Pacific to the North Atlantic. *Journal of Biogeography* 38, 756-771.
- Coyer, J.A., Hoarau, G., Costa, J.F., Hogerdijk, B., Serrão, E.A., Billard, E., Valero, M., Pearson, G.A. & Olsen, J.L. 2011. Phylogenetic and phylogeographic interactions between the intertidal brown macroalgae *Fucus spiralis* L. and *F. vesiculosus* L., throughout the North Atlantic. *Molecular Phylogenetics and Evolution* 58, 283-296.
- Eggers, L.S., Eriksson, B.K. and Matthiessen, B. 2011. A heat wave and dispersal cause dominance shift and decrease biomass in experimental metacommunities. *Oikos*, in press DOI: 10.1111/j.1600-0706.2011.19714.x
- Eklöf, J.S., Van der Heide, T., Donadi, S., Van der Zee, E.M., O'Hara, B., Eriksson, B.K. 2011. Habitat-mediated facilitation and counteracting ecosystem engineering interactively influence ecosystem responses to disturbance. *PLoS ONE* 6(8): e23229.
- Eriksson B.K., Rubach, A., Batsleer, J. and Hillebrand, H. 2012. Cascading predator control interact with productivity to determine the trophic level of biomass accumulation in a benthic food web. *Ecological Research* 27: 203–210.
- Eriksson B.K., Sieben, K., Eklöf, J., Ljunggren, L., Olsson, J., Casini, M. and Bergström, U. 2011. Effects of Altered Offshore Food Webs on Coastal Ecosystems Emphasize the Need for Cross-Ecosystem Management. *Ambio* 40: 786–797.
- Eriksson, B.K., Sluis, van C., Sieben, K., Kautsky, L. and Råberg, S. 2011. Omnivory and grazer functional composition moderate cascading trophic effects in experimental *Fucus*

- vesiculosus* habitats. Marine Biology 158: 747-756.
- Haydar, D., Hoarau, G., Olsen, J.L., Stam, W.T. & Wolff, W.J. 2011. Introduced or glacial relict - Phylogeography of the cryptogenic tunicate *Molgula manhattensis* De Kay (Asciacea, Pleurogona). Diversity and Distributions 17: 68-80.
- Heide, van der, T., Zee, van der, E., Donadi, S., Eklof, J.S., Eriksson, B.K., Olf, H., Piersma, T., Heide, van der, W. 2011. A simple and low-cost method to estimate spatial positions of shorebirds: the Telescope-Mounted Angulator. Journal of Field Ornithology 82: 80-87.
- Massa, S.I., Pearson, G.A., Aires, T., Kube, M., Olsen, J.L., Reinhardt, R., Serrao, E.A., Arnaud-Haond, S. 2011. Expressed sequence tags from heat-shocked seagrass *Zostera noltii* (Hornemann) from its southern distribution range. Marine Genomics 4:3: 181-188.
- Poortvliet, M., Galvan-Magana, F., Bernardi, G., Croll, D.A., Olsen, J.L. 2011. Isolation and characterization of twelve microsatellite loci for the Japanese Devilray (*Mobula japanica*). Conservation Genetics Resources 3: 733-735.
- Rubach, A., Hillebrand, H. and Eriksson, B.K. 2011. Understorey benthic microalgae and their consumers depend on habitat complexity and light in a microtidal coastal ecosystem. Aquatic Botany 95: 200-206.
- Sieben, K., Ljunggren, L., Bergström, U., Eriksson, B.K. 2011. A meso-predator release of stickleback promotes recruitment of macroalgae in the Baltic Sea. Journal of Experimental Marine Biology and Ecology 397: 79-84.
- Sieben, K., Rippen, A.D. and Eriksson, B.K. 2011. Cascading effects from predator removal depend on resource availability in a benthic food web. Marine Biology 158: 391-400.
- Wahl, M., Jormalainen, V., Eriksson, B.K., Coyer, J.A., Molis, M., Schubert, H., Dethier, M., Ehlers, A., Karez, R., Kruse, I., Lenz, M., Pearsohn, G., Rohde, S., Wikstrom, S.A. and Olsen, J.L. 2011. Stress ecology in *Fucus*: Abiotic, biotic and genetic interactions. Advances in Marine Biology. 57: 37-105.
- Wissler, L., Codoñer, F. M., Reusch, T.B.H., Olsen J.L., Procaccini, G. & Bornberg-Bauer, E. 2011. Back to the sea twice: identifying candidate plant genes for molecular evolution to marine life. BMC Evolutionary Biology 2011 11:8 - doi:10.1186/1471-2148-11-8.
- Zipperle, A.M., Coyer, J.A., Reise, K., Stam, W.T. & Olsen, J.L. 2011. An evaluation of small-scale genetic diversity and the mating system in *Zostera noltii* on an intertidal sandflat in the Wadden Sea. Annals of Botany 107: 127-133.

Congress abstracts – oral presentations

- Boer, de, M.K., Moor, H., Matthiessen B., Eriksson, B.K. Consequences of species loss for the ability of communities to recover from a simulated heat wave. Netherlands Annual Ecology Meeting 2011, 8-9 February 2011, NERN, Lunteren, the Netherlands. Oral presentation.
- Boer, de, M.K., Moor, H., Matthiessen B., Eriksson, B.K. Consequences of species loss for the ability of communities to recover from a simulated heat wave. Aquatic Science Meeting, 13-18 February 2011, ASLO, San Juan, Puerto Rico. Oral presentation.
- Donadi, S., van der Heide, T., van der Zee, E., Eklöf, J., van de Koppel, J., Eriksson, B.K. Scale-dependent effects of an ecosystem engineer determine the spatial distribution of bivalves in an intertidal ecosystem. Netherlands Annual Ecology Meeting 2011, 8-9 February 2011, NERN, Lunteren, the Netherlands. Oral presentation.
- Donadi, S., van der Heide, T., van der Zee, E., Eklöf, J., van de Koppel, J., Eriksson, B.K. Scale-dependent effects of an ecosystem engineer determine the spatial distribution of bivalves

in an intertidal ecosystem. Limnology and Oceanography in a Changing World, Aquatic Science Meeting, 13-18 February 2011, San Juan, Puerto Rico. Oral presentation.

Eriksson, B.K., Sieben, K., Eklöf, J., Ljunggren, L., Olsson, J., Casini, M., Bergström U. Consequences for coastal habitats of human transformation of offshore food-webs. Aquatic Science Meeting, 13-18 February 2011, ASLO, San Juan, Puerto Rico. Oral presentation.

Matthiessen, B., de Boer, M.K., Moor, H., Eriksson, B.K. Consequences of dominant species loss for community resilience after a realistically simulated heat wave. World Conference on Marine Biodiversity, 26-30 September 2011, MarBEF, Aberdeen, Scotland, United Kingdom. Oral presentation.

Poortvliet, M., Newton, K., Galván-Magaña, F., O' Sullivan, J., Weng, K., Bernardi, G., Croll, D.A., Olsen, J.L. Genetic Structure of a Pelagic Elasmobranch, the Spinetail Devilray (*Mobula japonica*) in the Pacific Ocean. Joint Meeting of Ichthyologists and Herpetologists, Minneapolis, USA, July 6-11, 2011.

Poortvliet, M., Newton, K., Galván-Magaña, F., O' Sullivan, J., Weng, K., Bernardi, G., Croll, D.A., Olsen, J.A. Stock Structure of a Pelagic Elasmobranch, the Japanese Devilray (*Mobula japonica*) in the Pacific Ocean. 62nd Tuna Conference, Lake Arrowhead, USA, May 16-19, 2011.

Poortvliet, M., Newton, K., Galván-Magaña, F., O' Sullivan, J., Weng, K., Bernardi, G., Croll, D.A., Olsen, J.L. Worldwide Genetic Structure of a Pelagic Elasmobranch, the Spinetail Devilray (*Mobula japonica*). CEES day, University of Groningen, October 6, 2011.

Sieben, K., Ljunggren, L., Bergström, U., Rippen, A.D., Eriksson, B.K. Interacting effects of predator decline and resource enrichment on different spatial scales. Aquatic Science Meeting, 13-18 February 2011, ASLO, San Juan, Puerto Rico. Oral presentation.

Reports

Eriksson, B.K. 2011. Does overfishing promote algal blooms? Briefing Note for Committee on Fisheries of the European Parliament (PECH). Directorate-General for Internal Policies. Policy Department, Structural and Cohesion Policies: B. pp. 68.

Marine Evolution and Conservation (MarECon)

<http://www.rug.nl/research/marine-evolution-and-conservation/>

Group leader Prof. dr. P.J. Palsbøll

Composition of the group in 2011 (from 01-09-2011):

| Tenured staff | source | fte | period |
|-------------------------|---------------|------------|---------------|
| Prof. dr. P.J. Palsbøll | RUG | 1.0 | |

Post-docs

PhD-students

Technical and Administrative Staff

SECRETARY

| | | | |
|---------------|----------|------|--|
| H.G. TJOELKER | RUG-CEES | 0.25 | |
|---------------|----------|------|--|

TECHNICIAN

| | | | |
|-----------|-----|-----|--|
| M. Bérubé | RUG | 1.0 | |
|-----------|-----|-----|--|

Microbial Ecology

<http://www.rug.nl/research/microbial-ecology/>

Group leader Prof. dr. J.D. van Elsas

Composition of the group in 2011:

| Tenured Staff | Source | fte | period |
|---|--------------------|------------|-------------------------|
| Prof. dr. J.D. van Elsas | RUG | 1.0 | |
| Dr. J. Falcao Salles | RUG | 1.0 | |
| Post-docs | | | |
| Dr. A.M. Kielak | RUG | 0.9 | 15-04-2010 – 15-10-2012 |
| Dr. R.M. Nissinen | NWO | 1.0 | 01-04-2011 – 13-11-2014 |
| Dr. A.V. Semenov | NWO | 1.0 | 15-09-2008 – 31-12-2012 |
| Dr. P. Stevens | RUG | 0.9 | 01-05-2009 – 01-03-2012 |
| Dr. A.Cavalcante Franco Dias | NWO | 1.0 | 15-08-2011 – 15-01-2012 |
| PhD-students | | | |
| Drs. M.C. de Cassia Pereira e Silva | NWO | 1.0 | 15-09-2008 – 15-09-2012 |
| Drs. M.S. Cretoiu | RUG | 1.0 | 15-09-2009 – 15-09-2013 |
| Drs. O. Inceoglu | NWO | 1.0 | 07-09-2007 – 07-09-2011 |
| Drs. C.A. Mallon | bursary | 1.0 | 01-09-2009 – 01-09-2013 |
| Drs. R. Nazir | HEC-NUFFIC bursary | 1.0 | 01-09-2007 – 01-09-2011 |
| Drs. P.E. Puentes Tellez | NWO | 1.0 | 01-09-2009 – 01-09-2013 |
| Drs. M. Zhang | bursary | 1.0 | 01-11-2010 – 01-11-2014 |
| Technical and Administrative Staff | | | |
| <i>Secretary</i> | | | |
| J. de Vries-Veldkamp | RUG | 0.5 | |
| <i>Technician</i> | | | |
| Ing. J.K. Brons | RUG | 1.0 | |
| Guests | | | |
| I. Çelik | Turkije | | 20-06-2011 – 20-09-2011 |
| P. Hardoim | Brazil | | 21-11-2011 – 01-07-2012 |
| S. Raposo Cotta | Brazil | | 10-11-2011 – 31-07-2012 |
| M. Kumar Gopala Krishnan | India | | 01-09-2011 – 31-08-2012 |
| M. Shahid | Pakistan | | 01-02-2011 – 01-08-2011 |
| S. Videira | Brazil | | 10-05-2011 – 31-10-2011 |

Publications 2011

Publications in journals

- Ausec, L., van Elsas, J.D., Mandic-Mulec, I., 2011. Two- and three-domain bacterial laccase-like genes are present in drained peat soils. *Soil Biology and Biochemistry* 43: 975–983
- Do Carmo, F.L., dos Santos, H.F., Marins, E.F., van Elsas, J.D., Rosado, A.S., Peixoto, R.S., 2011. Bacterial structure and characterization of plant growth promoting and oil degrading bacteria from the rhizosphere of mangrove plants. *The Journal of Microbiology* 49: 535-543
- Dos Santos, H.F., Cury, J.C., do Carmo, F.L., dos Santos, A.L., Tiedje, J., van Elsas, J.D., Rosado, A.S., Peixoto, R.S., 2011. Mangrove bacterial diversity and the impact of oil contamination revealed by pyrosequencing: bacterial proxies for oil pollution. *PLoS One* 6(3):e16943.
- Hardoim, P.R., Andreote, F.D., Reinhold-Hurek, B., van Overbeek, L.S., van Elsas, J.D., 2011. Rice root-associated bacteria: insights into community structures across 10 cultivars. *FEMS Microbiol Ecol.* 77: 154-64
- Hill, P., Kristufek, V., Dijkhuizen, L., Boddy, C., Kroetsch, D., Elsas, J.D. van, 2011. Land use intensity controls Actinobacterial community structure. *Microbial ecology*, 61: 286-302
- Inceoglu, Ö., Al-Soud, W.A., Salles, J.F., Semenov, A.V., van Elsas, J.D., 2011. Comparative analysis of bacterial communities in a potato field as determined by pyrosequencing. *PLoS ONE* 6(8):e23321
- Lencastre Fernandes, R., Niervchlo, M., Lundin, L., Pedersen, A.E., Puentes Tellez, P.E., Dutta, A., Carlquist, M., Bolic, A., Schäpper, D., Brunetti, A.C., Helmark, S., Heins, A.L., Jensen, A.D., Nopens, I., Rottwitt, K., Szita, N., van Elsas, J.D., Nielsen, P.H., Martinussen, J., Sørensen, S.J., Lantz, A.E., Gernaey, K.V., 2011. Experimental methods and modeling techniques for description of cell population heterogeneity. *Biotechnology Advances* 29: 575-599
- Lombard, N., Prestat, E., van Elsas, J.D., Simonet, P., 2011. Soil-specific limitations for access and analysis of soil microbial communities by metagenomics. *FEMS Microbiology Ecology* 78: 31-49
- Nunes da Rocha, U., van Elsas, J.D., van Overbeek, L.S., 2011. *Verrucomicrobia* subdivision 1 strains display a difference in the colonization of the leek (*Allium porrum*) rhizosphere. *FEMS Microbiology Ecology* 78: 297-305
- Semenov, A.V., van Overbeek, L., Termorshuizen, A.J., van Bruggen, A.H.C., 2011. Influence of aerobic and anaerobic conditions on survival of *Escherichia coli* O157:H7 and *Salmonella enterica serovar* Typhimurium in Luria-Bertani broth, farm-yard manure and slurry. *Journal of Environmental Management* 92: 780-787
- Silva, M.C.P., Semenov, A.V., van Elsas, J.D., Salles, J.F., 2011. Seasonal variations in diversity and abundance of diazotrophic communities across soils. *FEMS Microbiology Ecology* 77: 57-68

- Stevens, P., Overbeek, L.S. van, Elsas, J.D. van, 2011. *Ralstonia solanacearum* DeltaPGI-1 strain KZR-5 is affected in growth. Response to cold stress and invasion of tomato. *Microbial ecology* 61: 101-112
- Van Elsas, J.D., Boersma, F.G.H., 2011. A review of molecular methods to study the microbiota of soil and the mycosphere. *European Journal of Soil Biology* 47: 77-87
- Van Elsas, J.D., Semenov, A.V., Costa, R., Trevors, J.T., 2011. Survival of *Escherichia coli* in the environment: fundamental and public health aspects. *The ISME journal*, 5: 173-183
- Warmink, J.A., Nazir, R., Corten, B., van Elsas, J.D., 2011. Hitchhikers on the fungal highway: The helper effect for bacterial migration via fungal hyphae. *Soil Biology & Biochemistry* 43: 760-765

Dissertations

- Hardoim, P.R., 2011. Bacterial endophytes of rice- their diversity, characteristics and perspectives. Rijksuniversiteit Groningen. Promotor: Prof.dr. J.D. van Elsas
- Inceoglu, Ö., 2011. Normal operating range of the microbial community under potato. Rijksuniversiteit Groningen. Promotor: Prof.dr. J.D. van Elsas

THEORETICAL BIOLOGY

<http://www.rug.nl/research/theoretical-biology/>

Group leader Prof. dr. F.J. Weissing

Composition of the group in 2011:

| Tenured staff | source | fte. | period |
|---|---------------------|-------------|-------------------------|
| Prof. dr. I.R. Pen | RUG | 1.0 | |
| Prof. dr. F.J. Weissing | RUG | 1.0 | |
| Prof. dr. R. Bijlsma | RUG | emeritus | |
| Postdocs | | | |
| Dr. H. Dugdale | NWO-Visitor's grant | 0.5 | 01-05-2011 – 01-02-2012 |
| Dr. L.M. Engqvist | RUG | 1.0 | 01-10-2008 – 01-10-2011 |
| Dr. P. van den Berg | NWO-ERGO | 1.0 | 01-11-2010 – 01-05-2013 |
| PhD students | | | |
| Drs. V. Brauer | NWO-ALW | 1.0 | 01-11-2011 – 01-04-2014 |
| Drs. R.F. Castillo Cajas | EU Marie Curie | 0.8 | 01-01-2009 – 01-07-2013 |
| Drs. A.L.F. Duarte | RUG | 1.0 | 01-11-2006 – 01-03-2011 |
| Drs. J. van Gestel | NWO | 1.0 | 01-11-2011 – 01-11-2015 |
| Drs. O. Ivanov | NWO-ALW | 0.5 | 01-09-2011 – 01-09-2015 |
| Drs. A.B.F. Ivens | RUG | 1.0 | 01-10-2006 – 01-11-2011 |
| Drs. L. Molleman | UE bursary | 1.0 | 01-10-2009 – 01-10-2013 |
| Technical and Administrative Staff | | | |
| <i>Secretary</i> | | | |
| I.C. Jansen | RUG | 0.4 | |
| <i>ICT-Counsellor</i> | | | |
| Dr. J. Bakker | RUG | 1.0 | |
| <i>Research assistant</i> | | | |
| Dr. A. Kamping | RUG | 1.0 | |
| Other PhD students | | | |
| Drs. A. Manser | University Zürich | | |
| Drs. J. Zhang | University Beijing | | |
| Drs. C. Zhang | University Beijing | | |
| Guests | | | |
| Dr. S.A. Baldauf | German Fellowship | | 01-09-2011 – 01-01-2013 |

Publications 2011

Publications in journals

- Abbot, P. *et al.* (incl. Pen, I.) (2011): Inclusive fitness theory and eusociality. *Nature* 471, E1-E4.
- Annavi, G., Dawson, D.A., Horsburgh, G.J., Greig, C., Dugdale, H.L., Newman, C., Macdonald, D.W. & Burke, T., 2011. Characterisation of twenty-one European badger (*Meles meles*) microsatellite loci facilitates the discrimination of second-order relatives. *Conservation Genetics Resources* 3, 515-518.
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