University of Groningen

Don't underestimate father

Lelono, Asmoro

DOI:
[10.33612/diss.97045753](https://doi.org/10.33612/diss.97045753)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2019

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Lelono, A. (2019). *Don't underestimate father: Effects of cryptic and non-cryptic paternal traits on maternal effect in a species without paternal care*. [Thesis fully internal (DIV), University of Groningen]. Rijksuniversiteit Groningen. <https://doi.org/10.33612/diss.97045753>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Don't underestimate father

Effects of cryptic and non-cryptic paternal
traits on maternal effects in a species
without paternal care

Asmoro Lelono

rijksuniversiteit
 groningen

The research reported in this thesis was carried out at the Behavioural Biology and Evolutionary Genetics, Behaviour and Development (EDGB) groups at the Groningen Institute for Evolutionary Life Sciences (GELIFES) according to the requirements of the Graduate school of Science (The Faculty of Science and Engineering, University of Groningen The Netherlands).

The research was supported by DIKTI scholarship from the Ministry of Research, Technology and Higher Education of the Republic of Indonesia awarded to Asmoro Lelono and Ton G G Groothuis and funds awarded to the latter.

Lay out : Legatron Electronic Publishing, Rotterdam, the Netherlands

Figure : Asmoro Lelono

Photo : Marwedi Nurratyo

Cover design : Asmoro Lelono

Printed by : IPSKAMP Printing, Enschede, the Netherlands

ISBN: 978-94-034-1986-2

rijksuniversiteit
 groningen

Don't underestimate father

Effects of cryptic and non-cryptic paternal
 traits on maternal effects in a species
 without paternal care

PhD thesis

to obtain the degree of PhD at the
 University of Groningen
 on the authority of the
 Rector Magnificus Prof. C. Wijmenga
 and in accordance with
 the decision by the College of Deans.

This thesis will be defended in public on

Friday 4 October 2019 at 12.45 hours

by

Asmoro Lelono

born on 15 October 1968
 in Wonogiri, Indonesia

Supervisor

Prof. A.G.G. Groothuis

Co-supervisor

Dr. B.J. Riedstra

Assessment Committee

Prof. J. Komdeur

Prof. M. Naguib

Prof. W. Goymann

يَتَأَيُّهَا الَّذِينَ ءَامَنُوا اسْتَعِينُوا بِالصَّبْرِ وَالصَّلَاةِ إِنَّ اللَّهَ مَعَ الصَّابِرِينَ ﴿١٥٣﴾

Hai orang-orang yang beriman, jadikanlah sabar dan shalat sebagai penolongmu, sesungguhnya Allah beserta orang-orang yang sabar.

O you who have believed, seek help through patience and prayer. Indeed, Allah is with the patient. **QS, Al Baqarah: 153).**

Contents

Chapter 1	General Introduction	9
Chapter 2	Female reproductive investment in relation to male attractiveness in red junglefowl (<i>Gallus gallus gallus</i>)	21
Chapter 3	Ejaculate testosterone levels affect maternal investment in red junglefowl (<i>Gallus gallus gallus</i>)	37
Chapter 4	The relationship between male social status, ejaculate and circulating testosterone concentration and female yolk androgen transfer in red junglefowl (<i>Gallus gallus gallus</i>)	67
Chapter 5	Does paternal immunocompetence affect offspring vulnerability to maternal androgens? A study in domestic chickens	87
Chapter 6	Synthesis (General Discussion)	107
	References	125
	Summary	147
	Samenvatting	151
	Ringkasan	157
	Acknowledgements	161

“Colorful” Asmoro Lelono, August 2019