An Introduction into Problems Occurring during Integration of Maternal-Fetal Findings into New Terminology/Classification

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ITEM

The Starting Point

Wise LD, Beck SL, Beltrame D, Beyer BK, Chahoud I, Clark RL (1997): Terminology of developmental abnormalities in common laboratory mammals (version 1). *Teratology* **55:** 249-292

finally a common position, suitable for further use
first version
valid for "all" species (incl. humans)
Craniofenestria &c.

How to proceed ?

Next Steps

Berlin Workshops: 1995 1998 2000 2002 2005 2007 2011

Classification: pros and cons

Malformation:

a permanent structural change that is likely to adversely affect the survival or health of the species under investigation.

Variation:

a change that occurs within the normal population under investigation and is unlikely to adversely affect the survival or health (may include retardations)

Next Steps

Practical implementation in more and more laboratories

- general acceptance
- need for an update ("Miscellaneous" as a category)
  - defining rules for updates
  - collection of suggestions
- First (European) call for proposals:
  - 31st Conference of the European Teratology Society, Elsinore, 2003

What would happen ?

Group Formation

Idea:

a group small enough to be able to work but including members of all contributing countries

Participants:

Ruth Clark, Meg Parkinson

Stephane Barbellion

Konstanze Grote, Jochen Buschmann

Amended tables were submitted to Ruth in autumn 2004, Ruth prepared proposal

Group Meeting

A face-to-face meeting was necessary after the exchange of many e-mails:

Haarlem, January 29-30, 2005
with all members present

Fine tuning of all tables
General comments
Maternal-fetal findings
Cross references
"ZIP codes"

Maternal-Fetal Findings

In the first terminology version:

some findings seemed to be somewhat misplaced:
Oligohydramnios, Polyhydramnios

placental findings were not included

Since these structures are not purely fetal ones, we decided to introduce/add a fourth table, called "Maternal-Fetal Findings"

In many laboratories, placental findings were somewhat neglected

Further Steps

Suggestion was presented to the Working Group

Susan Makris, Howard Solomon, David Wise, Keith Hazelden, Kok-Wah Hew

Kohei Shiota, Masao Horimoto, Michio Fujiwara

Ruth Clark, Stephane Barbellion, Jochen Buschmann

Agreement was reached

Main suggested changes

Role of numerical codes (if any) ?

need for hierarchical structure ?

For some observations the following was considered useful (case-by-case):

Further descriptive detail
Location of the finding
Severity grading

Additional Table – Maternal-fetal abnormalities

A separate table should be created for maternal-fetal abnormalities, to include placenta, umbilical cord, amniotic fluid, and fetal membranes

Table 4: Maternal-Fetal Anomalies

Region / Organ / Structure	Observation	Synonym or *Related Term*	Non-preferred Term	Definition	Note	Recommended additional information	Ver 1 Code No.
Amniotic fluid	Discolored amniotic fluid				Specify color		New
	Oligohydramnios	Reduced volume amniotic fluid		Less than normal amount of amniotic fluid		Severity	10006
	Polyhydramnios	Increased volume amniotic fluid		Excessive amount of amniotic fluid		Severity	10007
Placenta	Altered consistency						New
	Altered texture						New
	Discolored placenta				Specify color		New
	Fused placenta	Conjoined placenta			Specify structures that are fused		New
	Large placenta						New
	Malpositioned placenta	Displaced, Ectopic				Location	New
	Misshapen placenta	Abnormally shaped, Irregularly shaped				Description	New
	Pale placenta	Palid					New
	Red material around placenta						New
	Shared placenta	Placental twins		Two fetuses on one placenta			New
	Single lobe					Abnormal in rabbits	New
	Small placenta	Reduced	Hypoplastic, Rudimentary			Severity	New
	Split						New
	Supernumerary lobe						New
Umbilical cord	Long umbilical cord					Severity	New
	Short umbilical cord		Hypoplastic, Rudimentary			Severity	New

Potential Issues with Maternal-Fetal Findings: Classification ?

Region / Organ / Structure	Observation	M/V	Comments
Amniotic fluid	Discolored amniotic fluid	V	**How** discoloured ?
	Oligohydramnios	V	Decreased **to what extend** ?
	Polyhydramnios	V	Increased **to what extend** ?
Placenta	Altered consistency	V	Altered **how** ?
	Altered texture	V	Altered **how** ?
	Discolored placenta	V	**How** discoloured ?
	Fused placenta	V	
	Large placenta	V	Enlarged **to what extend** ?
	Malpositioned placenta	V	**How** malpositioned ?
	Misshapen placenta	V	**How** misshapen ?
	Pale placenta	V	
	Red material around placenta	V	
	Shared placenta	?	
	Single lobe	?	Rabbit specific
	Small placenta	V	**How** small ?
	Split		
	Supernumerary lobe	?	Rabbit specific
Umbilical cord	Long umbilical cord	V	**How** long ?
	Short umbilical cord	V	**How** short ?

Placental Pathology

"We evaluated the following components: maternal decidual necrosis, necrosis in the placental labyrinth, quality and quantity of vessels in the placental labyrinth, and the presence or absence of necrotic fetal remains. In grading necrosis, 0 = none, 1 = 0–10% necrosis, 2 = 10–50% necrosis, and 3 = >50% necrosis. In grading quality of vessels, 0 = no vessels present, 1 = vessels present but deficient in development, 2 = vessels normal, and 3 = vessels congested."

Witlin AG, Li ZY, Wimalawansa SJ, Grady JJ, Grafe MR, Yallampalli C., Placental and fetal growth and development in late rat gestation is dependent on adrenomedullin, Biol Reprod. 2002 Sep;67(3):1025-31.

The morphological lesions were classified as follows :

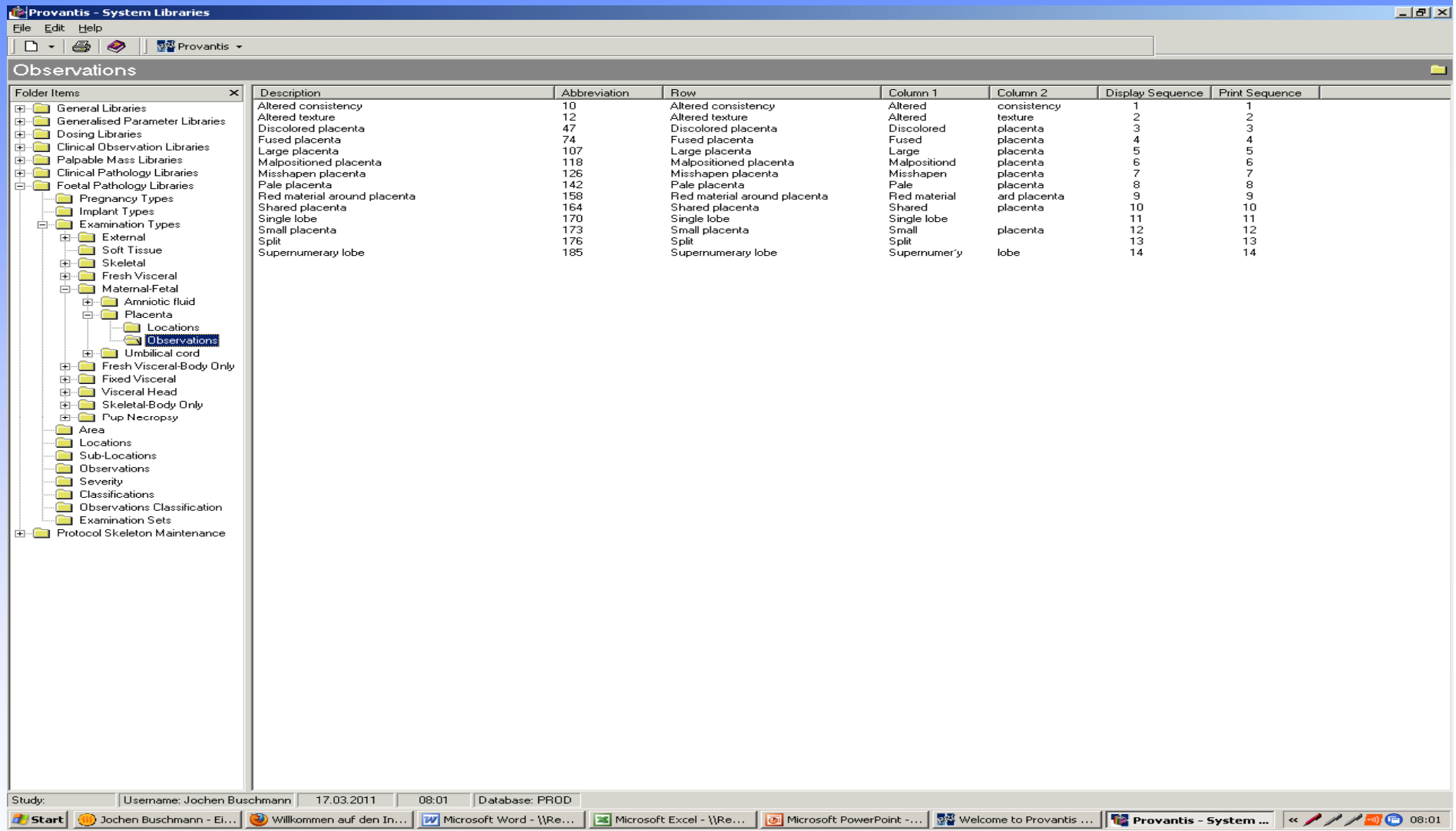
Group 1. "Normal". The control full term placenta showed a mild dilatation of the sinusoids in the spongiosa. Higher magnification revealed that the cytotrophoblastic cells were arranged in a cluster pattern, while the giant cells were dispersed among these clusters or arranged towards the maternal side of the placenta. The labyrinthic zone showed that the villi containing fetal blood vessels enclosed some nucleated erythrocytes, whereas outside the villi, the maternal sinusoids contained non nucleated erythrocytes.

Group 2. "Mild lesions". This group is characterized by the presence of solitary cystic formations in the spongiosa region, containing some cellular debris, and eosinophilic material. The size of the cysts was variable and they revealed well defined borders. The trophoblastic giant cells were few and some of them, specially in the vicinity of the cysts, showed some cytoplasmatic degeneration and increased nuclear basophilia.

Group 3. "Severe changes". These lesions were characterized by an increase in the number and size of cysts in the spongiosa region. The cysts were separated by thin acellular fibrous septa and contained a granular eosinophillic material. Sometimes they coalesced, thus forming a common multilocular formation. The giant cells showed more advanced degenerative changes than in the previous group, with pyknotic nuclei and karyorrhexis.

R. Prager , A. Abramoviei, E. Liban, and Z. Laron, Histopathological Changes in the Placenta of Streptozotocin Induced Diabetic Rats, Diabetologia 10, 89-91 (1974)

How Does it Currently Work in Practice ?



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Cross References

The observations in this glossary are organized into four tables for external, visceral, skeletal, and maternal-fetal abnormalities. The basis for inclusion of observations listed within each of these tables is 'type of abnormality' and the four tables are mutually exclusive (ie no abnormality is included in more than one table). However, it is expected that, in practice, abnormalities from any of the four tables might be selected for inclusion within internal glossary tables, set up for particular 'examination types' within a particular laboratory, and some observations might be included in more than one table.

Outlook / Future

Publication of the new version

Simultaneous publication in all three Societies' Journals worked (surprisingly) well

Electronic versions made available to all known software providers

Enable Permanent Terminology Update

Rules

Clearing House ?

(Berlin) Workshops (severity &c)

Maternal-Fetal Abnormalities as a new category require more attention !

Include more primate data

Update DevTox

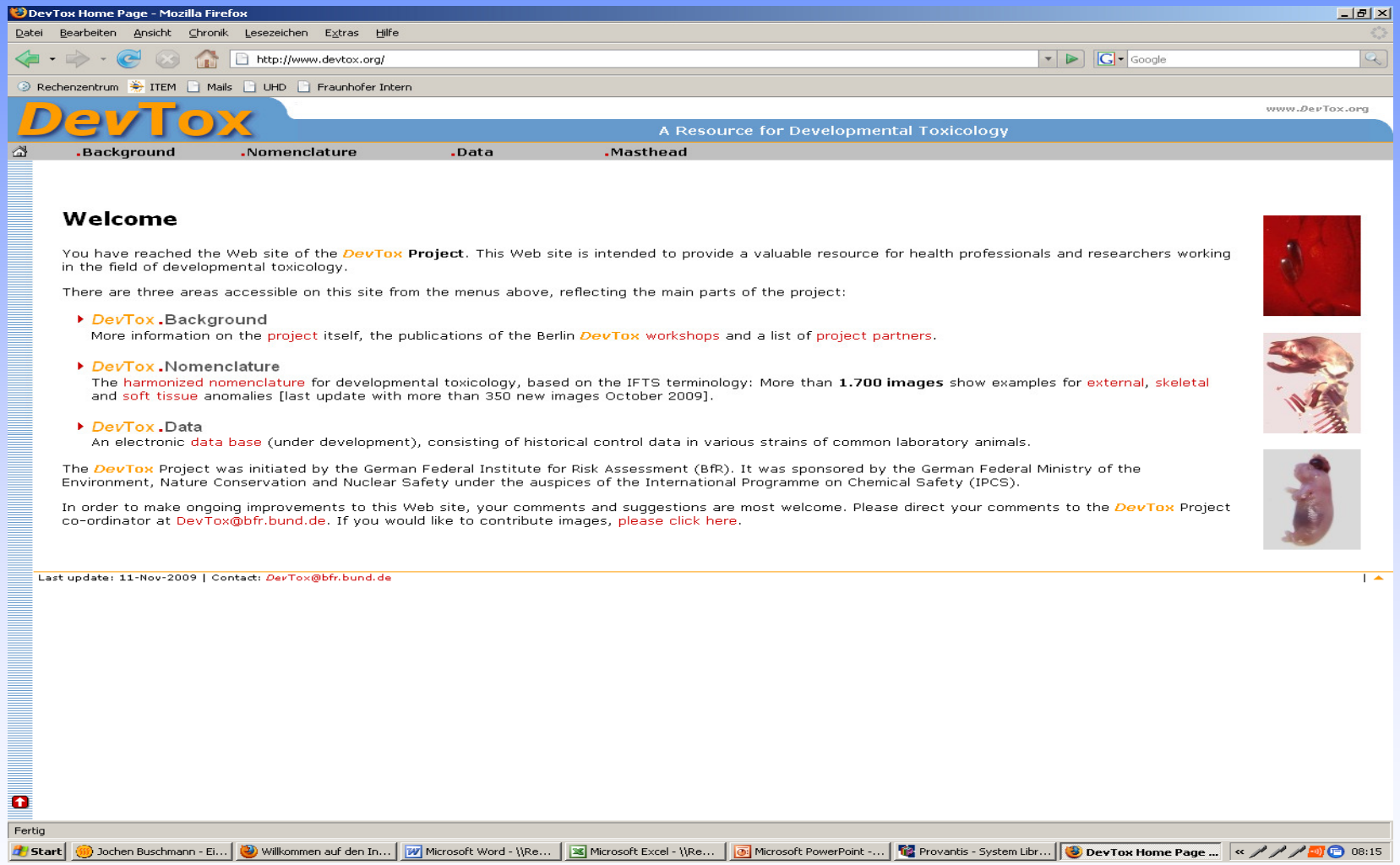
…a few words on www.devtox.org

because it is important to link terms with images !

New Images:

DevTox now has taken over all images from the (former) IFTS website

Check it out !



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DevTox News

Perspective

Update according to new terminology (including "Maternal-Fetal Findings")

Further development of terminology

Maternal toxicity
Patterns of findings
Reporting, automated data transfer
Postnatal consequences
More images
More project partners

DevTox should ideally represent the visualization of our terminology

… and now for something completely different

a rare malformation in rats:

Spring 2008

Pre-/postnatal study in rats (Crl:WU)

Control group (deionised water)

In a litter of 12 normal live pups (normally nursed by the dam), the following complex malformation was found in one "pup":


0
1
2
3

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Geert Prins identified this malformation as

"Acardius acephalusantruncus" or

"Acardius amorphus"

An acardiac fetus with a rudimentary body that does not resemble the normal form. Also called acardius anceps.
Mosby's Medical Dictionary, 8th edition. © 2009, Elsevier.

A shapeless product of conception covered by skin and hair.
Source: Stedman's Medical Spellchecker,
© 2006 Lippincott Williams & Wilkins. All rights reserved.

Asymmetrische parasitaire dubbel- monsters bij mens en dier
Straatgras. 4. 14 - [1]- 2002. ERWIN J.O. KOMPANJE .

'Een halve broer aan je buik': Asymmetrische parasitaire dubbel-monsters bij mens en dier

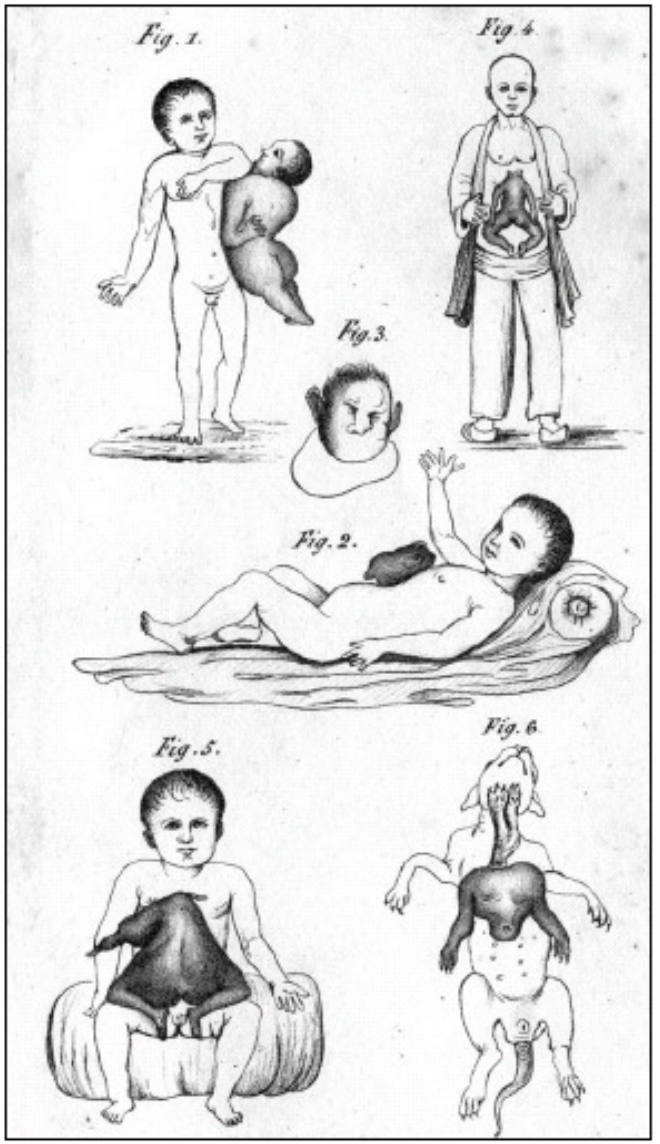
ERWIN J.O. KOMPANJE *

FIGUUR 1
GEMANIPULEERDE VORMEN BIJ HET GEDOMESTICEERDE VARKEN, HOUTSNEDE DOOR ALBRECHT DÜRER.

Het Natuurmuseum Rotterdam herbergt een fraaie collectie gedomesticeerde huisdieren met ernstige aangeboren afwijkingen, grotendeels afkomstig uit de voormalige verzameling van Gilbert de Vries. Deze collectie zal in de komende afleveringen van Straatgras door Erwin Kompanje worden beschreven. Naar aanleiding van een zeer bijzonder dubbelmonster bij een zwarte rat dat hij onlangs ontdekte in de collectie van Naturalis in Leiden en vooruitlopend op zijn reeks, schreef Erwin Kompanje alvast een artikel over een bijzondere groep dubbelmonsters: de zogenaamde asymmetrische of parasitaire dubbel-monsters. De betekenis van de eerste helft van de titel 'Een halve broer aan je buik' zal - na lezing van deze bijdrage - boekdelen spreken.

Van alle aangeboren afwijkingen bij mens en dier spreken de dubbelmonsters (twee of - zeer zeldzaam - drie met elkaar vergroeide individuen) het meest tot de verbeelding. Vanaf de vijftiende eeuw tot heden worden deze 'spelingen der natuur' beschreven en afgebeeld. Een van de oudste afbeeldingen uit Europa dateert van 1496 en is een fraaie kopergravure door Albrecht Dürer van een misgeboorte bij een gedomesticeerd varken dat zuidoostelijk van het Duitse Mülhausen ter wereld kwam. Op de afbeelding is onmiskenbaar een *cephalothoracoileopagus* (*cephalo* = hoofd; *thorako* = borst; *ileo* = buik; *pagus* = vasthechten), een van de meest complexe dubbelmonsters, te herkennen (Fig. 1). Het gedrocht is

*(dr E.J.O. Kompanje is collectiebeheerder zoogdieren van het NMR en gastmedewerker bij de afdeling zoogdieren van Naturalis e-mail kompanje@hotmail.com)



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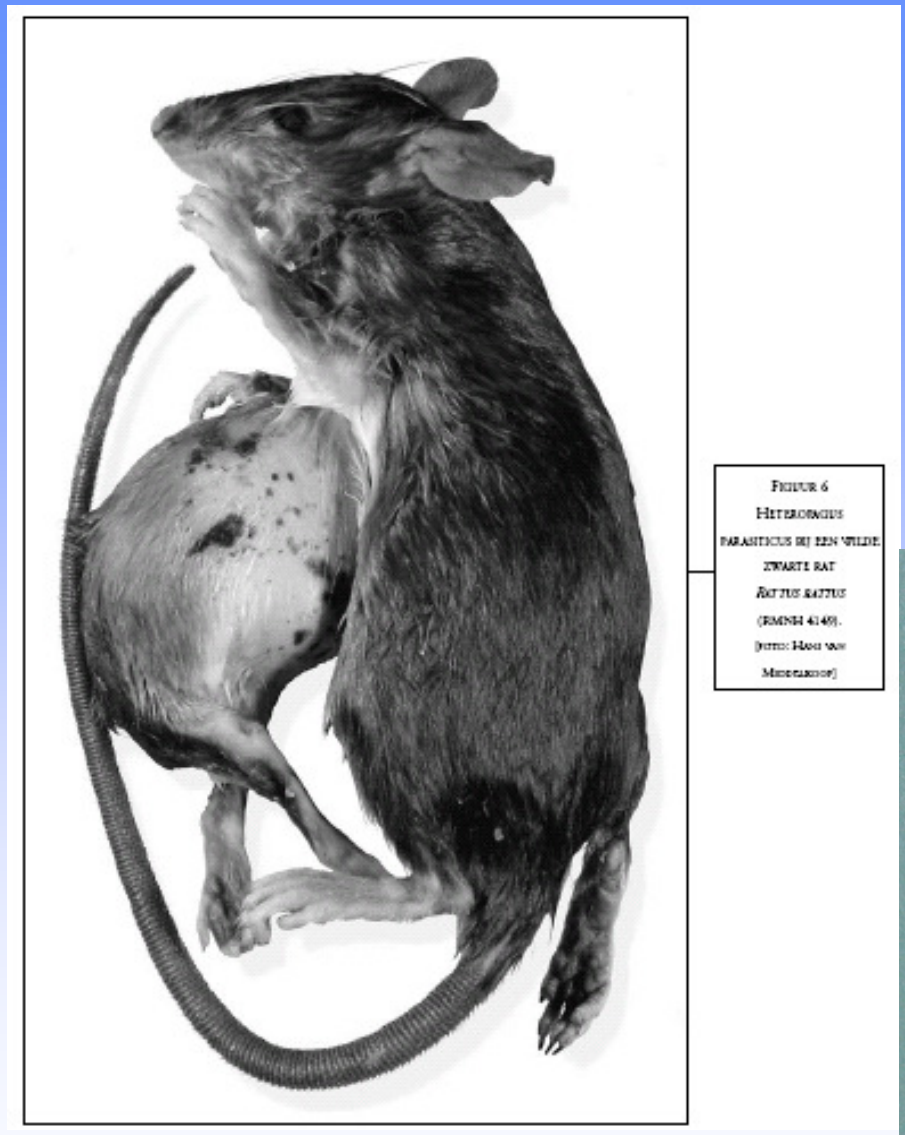

FIGUUR 6
HETERORGUS
PARASITICUS BIJ EEN WILDE
ZWARTE RAT
RATTUS RATTUS
(RMNH 4148).
[foto: Hans van
Middelkoop]

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Thanks for listening !