

HUMAN-ANIMAL RELATIONSHIP

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OVERVIEW

1. Evolution, Selection & Domestication
2. Cognition & Intelligence
3. Behavioral Systems
4. Abnormal Behaviour
5. Housing layers
6. Housing broilers
- 7. Human-Animal Relation**
8. Assessing, Monitoring & Labelling Poultry Welfare

7. HUMAN-ANIMAL RELATIONSHIP

- a) Mutilations
- b) Fear & Stockmanship
- c) Pre-slaughter
- d) (Culling & Slaughter – **self-study!**)

A. MUTILATIONS

1) Beak trimming*

- Laying hens, breeders of egg-type and meat-type chickens and turkeys

2) De-spurring*

- Meat-type parent males (excl. breeds with short spurs)
- Not in egg-type parent males (lower BW: $\searrow$ harm to females during mating)

3) Toe clipping*

- Broiler parent and grandparent males
- Not in egg-type parent males (lower BW: $\searrow$ harm to females during mating)

A. MUTILATIONS

4) Dubbing (cutting of single combs by scissors in the hatchery)

- Egg-type and meat-type parent males (less in brown egg-types: smaller combs)
- Reasons:
 - 1) identify sexing errors during rearing
 - 2) avoid losses due to excessive comb growth during adult life (may affect vision, feed intake, mating, fertility, mortality,...)
- Cons: affects communication, social status, reprod. behaviour, thermoregulation,...?

5) Individual identification (e.g. removing the inner toenail, cutting toe membrane, wing band)

- Egg-type and meat-type parents and grandparents
- Reasons:
 - 1) to distinguish pure lines
 - 2) prevent sex failures
 - 3) identify individual birds in breeding programmes

A. MUTILATIONS: BEAK TRIMMING

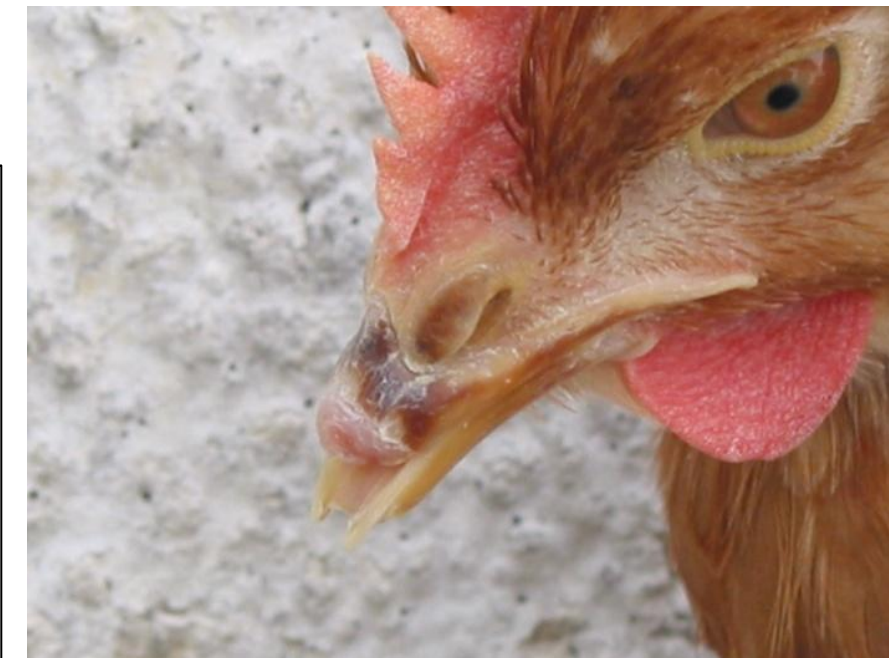
Not trimmed



Beak trimmed



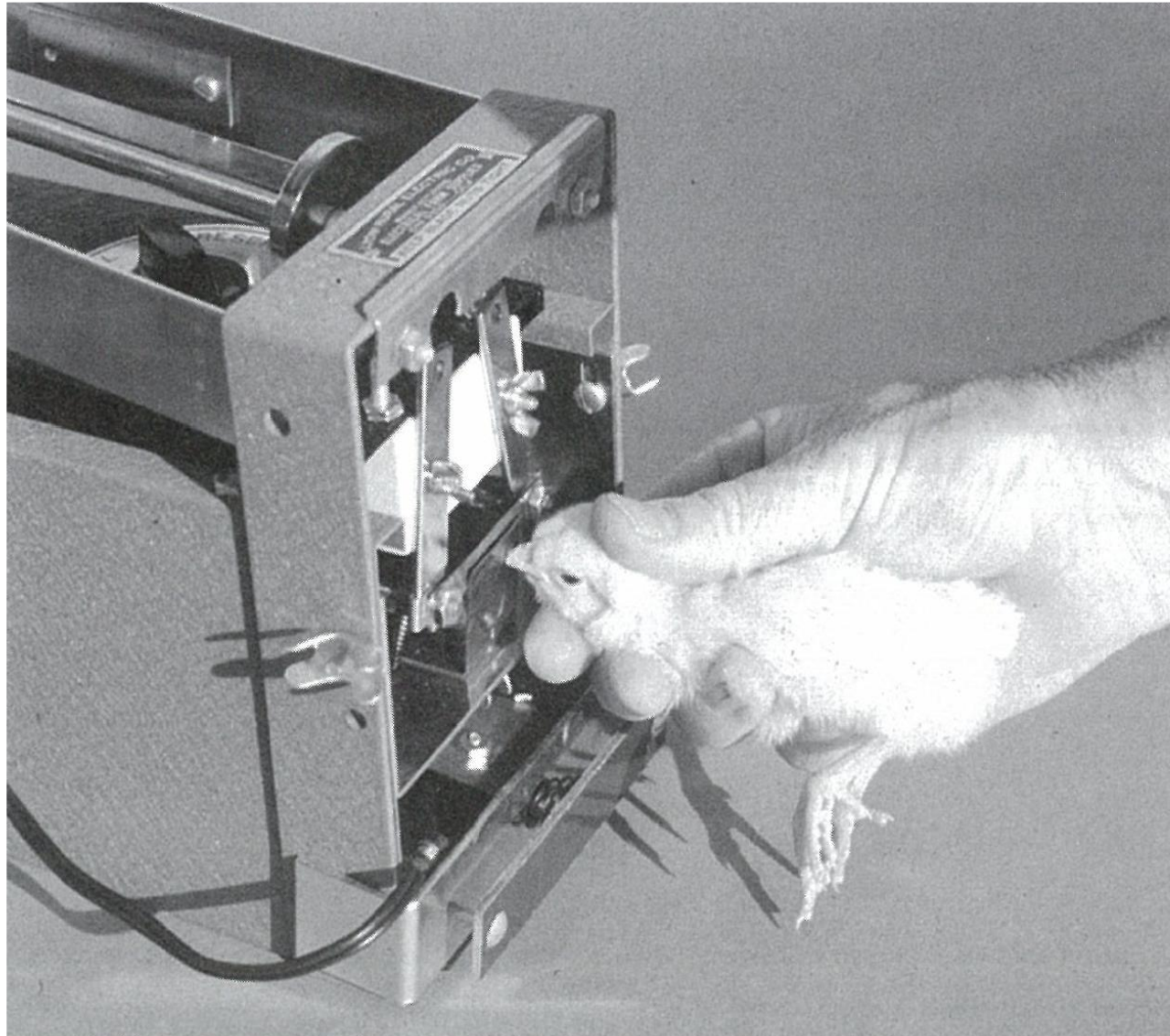
Severely trimmed



Animal welfare implications:

- Short-term treatment stress & pain (<10d)
- Chronic pain & neuromas (proliferations in nerve tissues) depending on degree of treatment
- Part of tactile beak lost (↘ selective and subtle pecking)

A. MUTILATIONS: BEAK TRIMMING



EU directive 1999/74/EC (laying hens):

All mutilations are prohibited except beak trimming (<10d) to prevent feather pecking and cannibalism

Banned in:

- Scandinavia, Austria, NL (2018)
- Organic layer farming



Now: precision infra-red heat treatment

- acute stress & pain
- no evidence of chronic pain
- minimal long-term neurophysiological & anatomical changes

A. MUTILATIONS: TOE CLIPPING / DE-SPURRING

Mating: risk of injuring hens

- Hens struggle during mating (because roosters no longer display courtship behaviour?)
- Roosters have sharp nails and spurs
- Roosters have become heavier

In the hatchery (day-old chicks)

- Removal of posterior (+ middle) toes with hot knife/wire or infrared
- Removal of keratin layer from the spur by burning it off (except Ross, banned in Norway, Sweden, NL)

Animal welfare implications:

- Short-term treatment stress & pain (<10d)
- Toe clipping: risk of chronic pain & neuromas, balance?
- Importance spurs sexual behaviour (choice of rooster by hen)?

B. FEAR & STOCKMANSHIP



Touch/Approach test (white hens are more anxious)

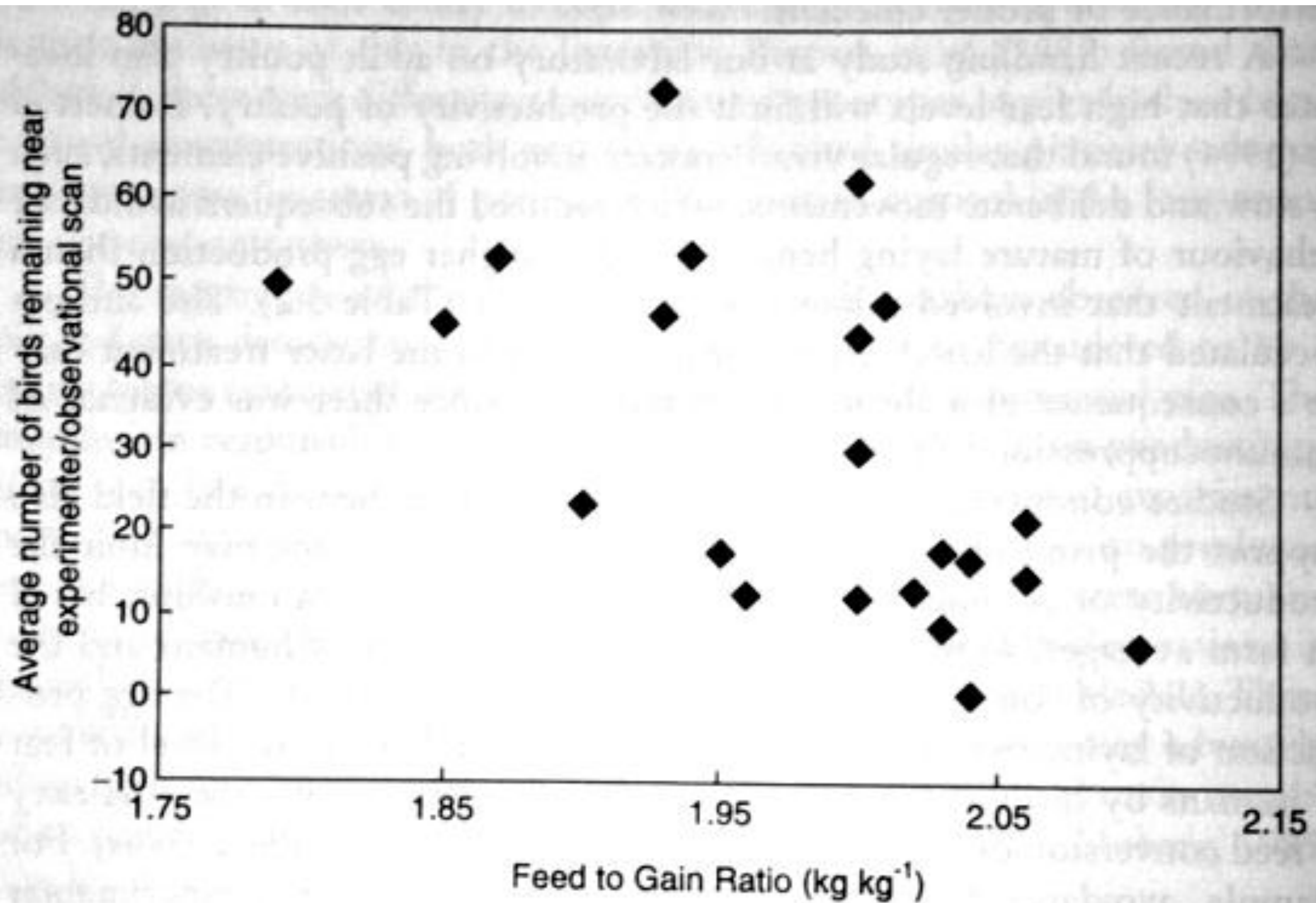


Fig. 3.4. The relationship, based on farm averages, between fear of humans and feed conversion at 22 commercial broiler chicken farms.

B. FEAR & STOCKMANSHIP



Gentle handling



C. PRE-SLAUGHTER: INFO



SCIENTIFIC OPINION

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Welfare of domestic birds and rabbits transported in containers

EFSA Panel on Animal Health and Welfare (AHAW),
Søren Saxmose Nielsen, Julio Alvarez, Dominique Joseph Bicot, Paolo Calistri,
Elisabetta Canali, Julian Ashley Drewe, Bruno Garin-Bastuji, Jose Luis Gonzales Rojas,
Christian Gortázar Schmidt, Mette Herskin, Virginie Michel, Miguel Ángel Miranda Chueca,
Barbara Padalino, Helen Clare Roberts, Hans Spoolder, Karl Stahl, Arvo Viltrop,
Christoph Winckler, Malcolm Mitchell, Leonardo James Vinco, Eva Voslarova, Denise Candiani,
Olaf Mosbach-Schulz, Yves Van der Stede and Antonio Velarde

C. PRE-SLAUGHTER: INFO



Consortium of the Animal Transport Guides Project (2017).
'Good practices for animal transport in the EU: poultry'
(SANCO/2015/G3/SI2.701422)

C. PRE-SLAUGHTER: EU LEGISLATION

[Council Regulation \(EC\) No 1/2005](#) currently defines the responsibilities of all actors, involved in the transport chain of live animals entering or leaving the EU. This includes monitoring tools, inspections and means of transport.

On 7 December 2023, the Commission adopted a [proposal for a Regulation of the Council and European Parliament on the protection of animals during transport](#) to replace [EC No 1/2005](#).
(To be approved by EU-Council & EU-Parliament)

Main objectives (essential for the welfare of animals in transport):

- reduce AW problems linked to long journeys and repetitive unloading and re-loading linked to several rest periods
- ensure that animals have more space when transported
- improve the conditions of transport of vulnerable animals
- avoid exposing animals to extreme temperatures
- facilitate enforcement of EU rules on the protection of animals, including through digitalisation
- better protect animals exported to non-EU countries

C. PRE-SLAUGHTER

EFSA (2022): Most relevant welfare consequences of road transport of domestic birds:

Welfare consequence	<i>Preparation</i>	<i>Loading</i>	<i>Journey</i>	<i>Arrival</i>	<i>Uncrating</i>
Handling stress	<i>n.a.</i>	X	—	—	X
Bone lesions	<i>n.a.</i>	X	X	X	X
Soft tissue lesions and integument damage	<i>n.a.</i>	X	X	X	X
Restriction of movement	<i>n.a.</i>	X	X	X	X
Sensory overstimulation	<i>n.a.</i>	X	X	X	X
Motion stress	<i>n.a.</i>	—	X	X	—
Heat stress	<i>n.a.</i>	—	X	X	—
Cold stress	<i>n.a.</i>	—	X	X	—
Prolonged hunger	<i>n.a.</i>	—	X	X	—
Prolonged thirst	<i>n.a.</i>	—	X	X	—

➤ discomfort, stress, exhaustion, fear, frustration, pain

C. PRE-SLAUGHTER

Preventing welfare problems during **pre-slaughter phase** of broiler chickens in **Belgium**
(Welltrans project 2013-2016)

	%	Number
Total chickens	100	300.000.000
Scratches/wounds	30	90.000.000
Bruising	3.7	11.100.000
Heat stress	2.0	6.000.000
Wing fractures	1.9	5.700.000
DOA	0.3	900.000



C. PRE-SLAUGHTER: PREPARATION

Fit-for-Transport: check each animal for suitability to be transported

EC 1/2005:

*" No animal shall be transported unless it is **fit for the intended journey**, and all animals shall be transported in **conditions guaranteed not to cause them injury or unnecessary suffering**."*

(difficult to set uniform criteria as characteristics of the intended journey need to be taken into account)

Reason: sick, wounded and weakened animals have higher risks for AW problems during transport (e.g. weakened animals cannot avoid aggression or lose balance more easily)

Responsible person?

<8h transport: farmer & driver

>8h transport: inspector (during loading)

C. PRE-SLAUGHTER: FIT-FOR-TRANSPORT

EC 1/2005

*Animals that are **injured** or that present physiological **weaknesses** or **pathological** processes shall not be considered fit for transport, and in particular if:*

- (a) they are **unable to move independently** without pain or to walk unassisted;*
- (b) they present a **severe open wound**, or **prolapse**;*

→ Ought to be **treated** / **culled** a.s.a.p. at the farm

Financial losses & costs

Only to SH if suitable for human consumption (antemortem inspection & declaration by vet)
and if transported hygienically (EG 853/2004)

C. PRE-SLAUGHTER: FIT-FOR-TRANSPORT

EFSA (2022) recommendations: birds UNFIT for transport:

- Evident signs of illness
 - Emaciation and cachexia
 - Severe lameness: unable to stand or walk more than a few steps
 - Open wounds and prolapse
 - Poor feather cover in low effective temperature (end-of-lay hens only)
 - Broken bones (legs, wings) and dislocations
 - Wet plumage in low effective temperature (except for ducks and geese)
-
- Checks ≤ 12 h before catching + during catching & loading
 - Need for training staff
 - Competent person responsible for AW should be present during catching & loading, as well as a person (and equipment) to cull unfit birds

C. PRE-SLAUGHTER: FIT-FOR-TRANSPORT (CANADA)



SHOULD THIS BIRD BE LOADED?

Guidelines for Transporting Poultry

LOAD & TRANSPORT HEALTHY BIRDS

DO NOT LOAD DO NOT TRANSPORT

- Weak and/or not alert
- Dark red, purple, or black combs or wattles
- Discharge from eyes/nostrils
- Swollen head/neck
- Skin on head or neck is dark red or very pale (**Exception: Toms may have bright blue skin in this area**)
- Bloody and/or prolapsed vents
- Emaciated and weak: very thin, easily felt breastbone (**Exception: End-of-lay hens may have pronounced breastbones but if emaciated they must not be loaded**)
- Dislocated, broken, or exposed bones (**including injury due to handling**)
- Unable to rise or walk due to physical abnormality or injury

Birds not loaded should be segregated according to on-farm protocol. Notify farm manager of birds left on the farm before leaving.

CAUTION

Conditions requiring assessment before loading

Environmental

- Wet birds in cool or cold weather
- Heat and/or humidity
- Cold and/or wind chill
- Road closures

Individual Bird

- Minor trauma, wounds or bleeding (**including injury due to handling**)

Flock

- Diarrhea
- Coughing and sneezing -"snicking"
- If a flock is diagnosed with a disease by a veterinarian or laboratory, special provisions for loading may be required.

Assessment and joint decisions should be made by the producer, catching crew, hauler and processing plant when faced with CAUTION conditions.

Regulations

No person shall load or caused to be loaded... an animal that by reason of infirmity, illness, injury, fatigue or any other cause cannot be transported without undue suffering during the expected journey.

Health of Animals Regulations; Part XII, 138, 2a

DO NOT

- Transport a sick or injured bird
- Load or unload a bird in a way likely to cause injury or suffering
- Crowd birds to such an extent as to cause injury or undue suffering

www.inspection.gc.ca

Violators of the Health of Animals Act:

- ⇒ Fines up to \$10,000
- ⇒ Increased fines for repeat offenders
- ⇒ Repeat offenders posted on CFIA website

See the "Should This Bird Be Loaded" Handbook for more information.

C. PRE-SLAUGHTER: FIT-FOR-TRANSPORT (CANADA)

Guidelines for Dealing with Poultry

Identification of Sick or Injured Birds



Weak, not alert



Emaciated



Unable to walk



Swollen head



Discoloured comb



Broken leg



Unable to rise/walk due to physical abnormality
(Do not confuse with fatigue)

LOAD & TRANSPORT HEALTHY BIRDS

1. Identify
2. Cull
3. Dispose

CFIA Livestock Emergency Transport Line
1-877-814-2342



Environmental Considerations

Maximum Loading & Transport Guidelines	Moderate Density	Extreme Heat Density
Broiler Chickens	63 kg/m ²	54 kg/m ²
Broiler Breeders	66 kg/m ²	56 kg/m ²
Turkeys	98 kg/m ²	83 kg/m ²
End-of-Lay Hens	63 kg/m ²	54 kg/m ²

Reference: The Recommended Code of Practice for the Care and Handling of Farm Animals - Poultry

Factors to Consider

- Duration of transport (including loading and lairage)
- Weather at load out, along travel route and at processing plant
- Time of day of load out
- Number of birds in the barn
- Ventilation in barn
- Condition of barn (eg. litter)

Recommended Code of Practice for the Care & Handling of Farm Animals

Air temperature in load should be maintained at 5°C to 30°C for all birds, except end-of-lay hens, which should be maintained at 13°C to 30°C

Recent research (Mitchell and Kettlewell, 2008) recommends for broilers, an upper in load temperature limit of 24°C.

C. FLANDERS: BROILERS TO BE CULLED (SELECTION)

<https://youtu.be/toT9Qp8y-Kc>

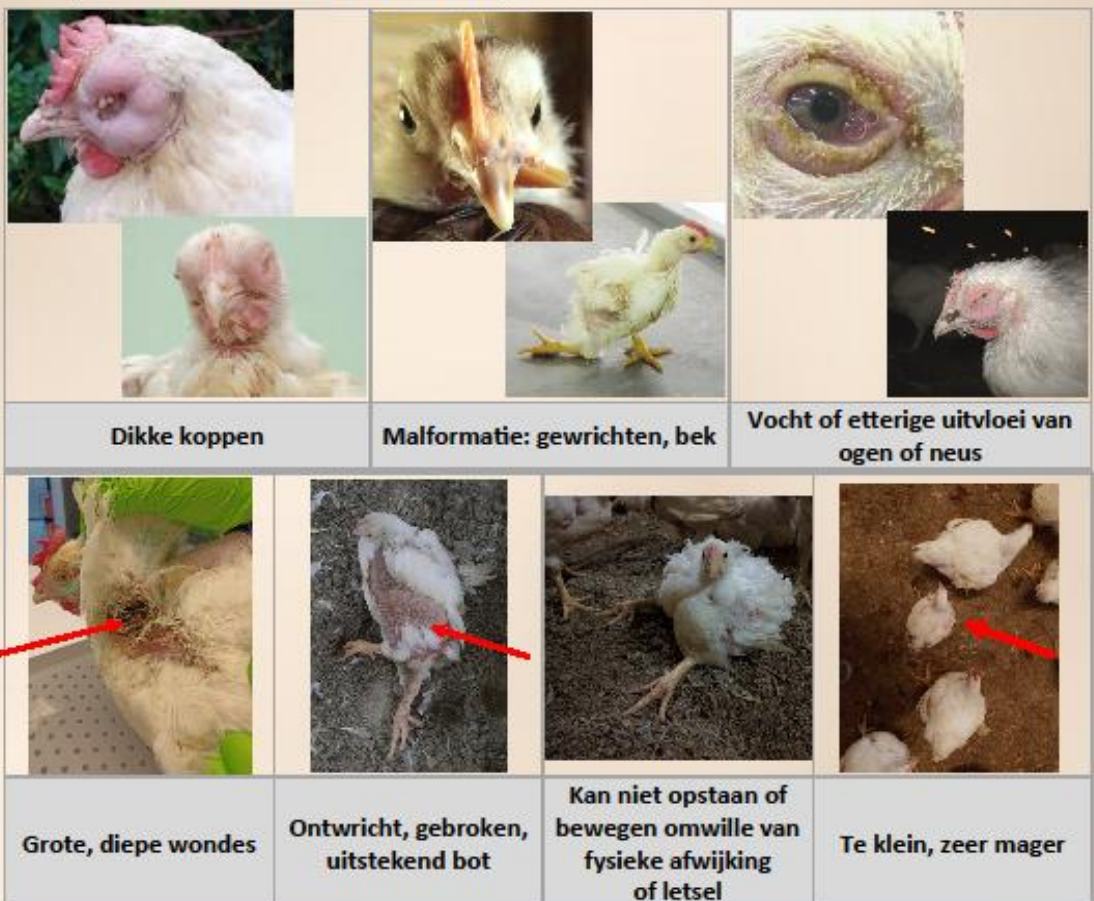
WELKE DIEREN UITSELECTEREN TIJDENS DE RONDE WANT NIET GESCHIKT VOOR TRANSPORT

Individuele dieren met onderstaande symptomen

• WEEK 1



• TIJDENS DE HELE RONDE



Op toom niveau



Conclusie

Dieren uitsélectioneren want niet geschikt voor transport:

- WEEK 1
 - Zwak, suf & lethargisch
 - Sterrenkijker, gespreide poten
 - Te klein, zeer mager
 - Slechte navelkwaliteit
- TIJDENS DE HELE RONDE
 - Dikke koppen
 - Malformatie: gewrichten & bek
 - Vocht of etterige uitvloeit van ogen of neus
 - Grote, diepe wonden
 - Ontwricht, gebroken, uitstekend bot
 - Kan niet opstaan of bewegen omwille van fysieke afwijking of letsel
 - Te klein, zeer mager
- TOOM NIVEAU
 - Algemene tekenen van ziekte, massale sterfte in de toom
 - Newcastle Disease - Draainek
 - Aangifte plichtige ziekten: Aviaire influenza
 - Natte veren bij koude buiten temperatuur

TWIJFEL?
CONTACTEER
UW DIERENARTS

→ Dieren die niet geschikt zijn voor transport moeten zo snel mogelijk humaan geëuthanaseerd worden.

C. FLANDERS: BROILERS UNFIT FOR TRANSPORT (CATCHER)

WELKE DIEREN MOGEN NIET GELADEN WORDEN?

NIET LADEN
NIET TRANSPORTEREN

Individuele dieren met onderstaande symptomen

 		
Zwak, suf, lethargisch	Te klein, zeer mager	Vocht of etterige uitvloeit van ogen of neus
		
Dikke koppen	Kan niet opstaan of bewegen omwille van fysieke afwijking of letsel	
		
Grote, diepe wondes	Ontwricht, gebroken, uitstekend bot	

Op toom niveau

 	 
Toom in slechte toestand	Newcastle Disease - Draainek
  	
Aangifte plichtige ziekten: Aviaire influenza	

Conclusie

Dieren niet geschikt voor transport:

- Zwakke, suffice & lethargische dieren
- Te kleine of zeer magere dieren
- Vocht of etterige uitvloeit van ogen of neus
- Dikke koppen
- Grote, diepe wondes
- Ontwricht, gebroken, uitstekend bot
- Kan niet opstaan of bewegen omwille van fysieke afwijking of letsel
- Natte veren bij koude buiten temperatuur
- Algemene tekenen van ziekte, massale sterfte in de toom
- Newcastle Disease - Draainek
- Aangifte plichtige ziekten: Aviaire influenza

→ Dieren die niet geschikt zijn voor transport moeten zo snel mogelijk humaan geëuthanaseerd worden.

TWIJFEL?
CONTACTEER
UW DIERENARTS

C. FLANDERS: HENS UNFIT FOR TRANSPORT (CATCHER)

WELKE DIEREN MOGEN NIET GELADEN WORDEN?

NIET LADEN
NIET TRANSPORTEREN

Individuele dieren met onderstaande symptomen

  		 
Zwak, suf, lethargisch	Te klein, zeer mager	Vocht of etterige uitvloeit van ogen of neus
 	 	 
Dikke koppen	Kan niet opstaan of bewegen omwille van fysieke afwijking of letsel	
	 	
Grote, diepe wondes	Ontwricht, gebroken, uitstekend bot	

Op toom niveau

 	
Toom in slechte toestand	Newcastle Disease - Draainek
	
Aangifte plichtige ziekten: Aviaire influenza	

Conclusie

Dieren niet geschikt voor transport:

- Zwakke, suffice & lethargische dieren
- Te kleine of zeer magere dieren
- Vocht of etterige uitvloeit van ogen of neus
- Dikke koppen
- Grote, diepe wondes
- Ontwricht, gebroken, uitstekend bot
- Kan niet opstaan of bewegen omwille van fysieke afwijking of letsel
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→ Dieren die niet geschikt zijn voor transport moeten zo snel mogelijk humaan geëuthanaseerd worden.

TWIJFEL?
CONTACTEER
UW DIERENARTS

C. PRE-SLAUGHTER: CATCHING & HANDLING

EC 1/2005

Prohibited to:

- (a) strike or kick the animals*
- (b) apply pressure to any particularly sensitive part of the body in such a way as to cause them unnecessary pain or suffering*
- (c) suspend the animals themselves by mechanical means*
- (d) lift or drag the animals by head, ears, horns, **legs** tail or fleece, or handle them in such a way as to cause them unnecessary pain or suffering*
- (e) use prods or other implements with pointed ends*
- (f) knowingly obstruct any animal which is being driven or led through any part where animals are handled*

?

Most common catching method
(most countries)



C. PRE-SLAUGHTER: CATCHING METHODS

Broilers & Layers

Manual

Inverted
(1 or 2 legs)

Upright
(1 or 2 birds)



Broilers

Mechanical

Harvester

Floor Belt



C. PRE-SLAUGHTER: CATCHING METHODS

Inverted



- ✓ **1 leg:** most common, although not recommended (EFSA 2022)
prohibited in e.g. NO, FI
- ✓ **2 legs:** takes longer
more restless, more resistance (Langkabel et al 2015)
- ✓ **Belgium catching teams:** av. 1842 broilers/person-hour (Jacobs et al 2017)

EFSA (2022) "*Inversion and carrying birds by the legs will increase the severity of handling **stress** with 90-100% certainty and the risk of **injuries** (dislocated joints, fractures in legs or wings and bruises) with 66-100% certainty compared to handling birds in an upright position*"



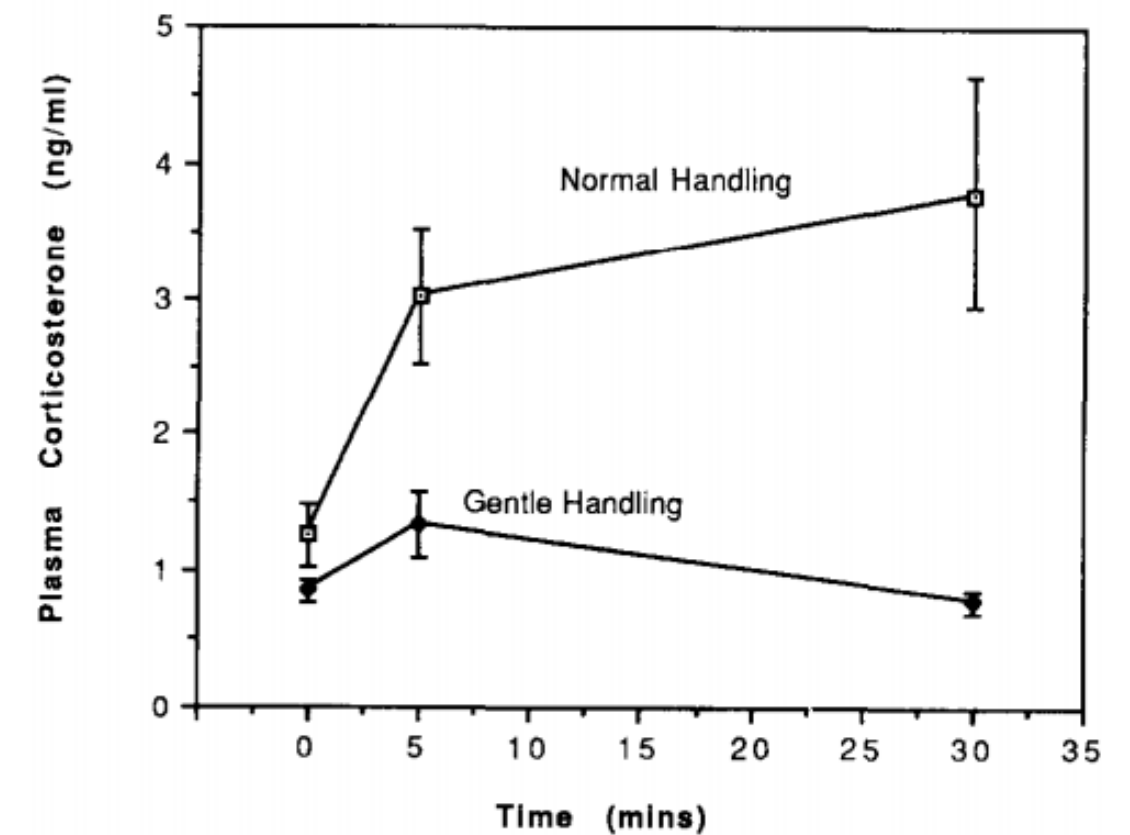
C. PRE-SLAUGHTER: CATCHING METHODS

Upright



https://www.youtube.com/watch?v=Odtead_7Piw

- ✓ Belly/breast supported, hand over wings
- ✓ 1 - 2 times slower than inverted
- ✓ ↘ corticosterone response (vs inverted)
- ✓ Recommended method for reducing lesions/rejections by:
 - EU Animal Transport Guides
 - EFSA 2022



EFSA 2022: *The AHAW panel concluded with 90-100% certainty that handling stress is lower, and with 66-100% certainty that risk of injuries is lower*

C. PRE-SLAUGHTER: CATCHING METHODS

Harvester

<https://www.youtube.com/watch?v=QGoqdknQaDc>



✓ (Mostly) upright

✓ **Pros:** potentially less stress for bird & catcher

- faster $\searrow$ heart rate
- $\searrow$ corticosterone response (vs inverted)
- $\searrow$ TI (fear)

✓ **Cons?**

- $\nearrow$ % broken wings; $\nearrow$ % bruises

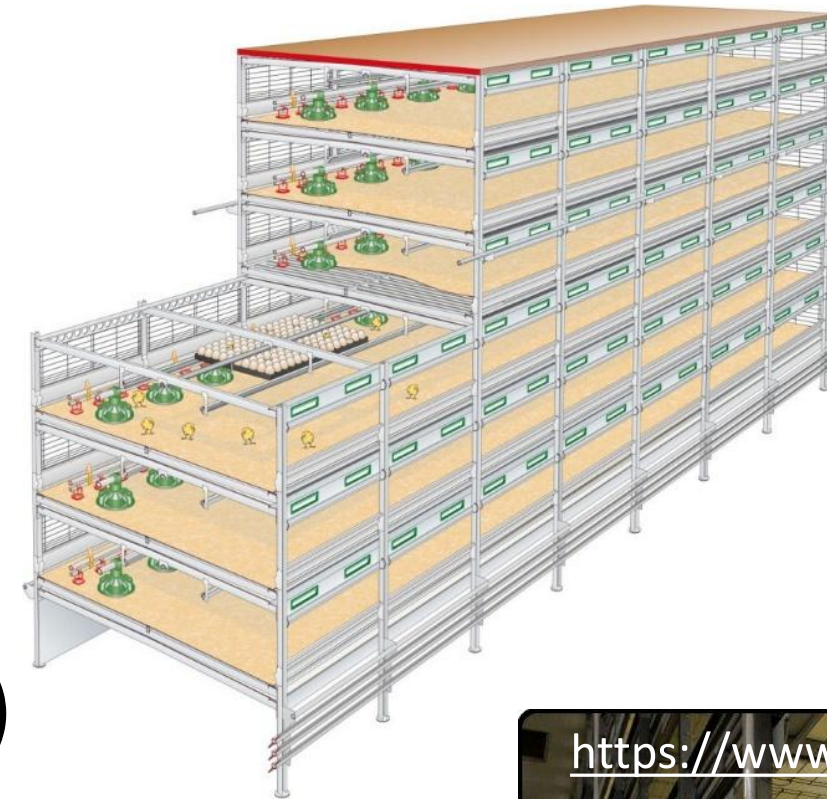
Many contradictions

→ dep. on type, catching & transport-technique
(avoid steep transport belts) & EXPERIENCE !

EFSA 2022 "*Mechanical catching can potentially reduce the risk of injuries compared to manual catching and inversion, if it is operated correctly*"

C. PRE-SLAUGHTER: CATCHING METHODS

Floor Belt



✓ Special housing system: **Patio** (Vencomatic)

- Multiple tiers
- On-farm hatching
- Mechanical loading via floor belt → transport belt



Peer System

<https://youtu.be/8mFP4isNuMY>

C. PRE-SLAUGHTER: CATCHING & LOADING

Recommendations EFSA (2022):

- Staff **trained** to avoid handling stress and risk of injuries
- Birds should be carried **upright** by holding the **wings against the body**
- Birds should not be **swung, thrown or dropped**
- If **inverted**: 2 legs, max 3 birds/hand, minimal duration (containers nearby), avoid wing flapping by placing the bird against the operator's leg,...

C. PRE-SLAUGHTER: CATCHING & LOADING

Proposal EU legislation animal transport (7/12/2023):

Catching by the legs is allowed, conditional upon:

- Both legs
- Breast supported (by operator's leg)
- Max. 3 birds/hand
- Minimum duration inverted

C. PRE-SLAUGHTER: CATCHING & LOADING

KIPVANG (2021- '24): compare catching methods

➤ **End-of-lay hens**

- 2 methods: inverted vs upright
- 7 flocks (3000 hens/flock/method)

➤ **Broilers**

- 3 methods: inverted vs upright vs mechanical
- 9 flocks (inverted vs upright)
- 3 flocks (inverted vs upright vs mechanical)
- 5000 chickens/flock/method

RESULTS - On-farm measures

	LAYERS			BROILERS			
	Inverted (n=398)	Upright (n=769)	P	Inverted (n=775)	Upright (n=1267)	Mechanical	P
Fixation time (s)	20.3	8.6	<0.001	6.5	3.3	NA	<0.001
Flapper frequency (1-7)	4.0	1.9	<0.001	5.4	2.0	NA	<0.001
Handling (1-7)	4.4	3.1	<0.001	4.4	3.7	NA	0.005
Man hours 1000 chickens (hours)	4.75 ^a	8.17 ^b	0.011	1.09 ^b	1.69 ^c	0,50 ^a	<0.001
Method not correctly applied (%) >3 chickens per hand - Wrong body part - Hands not around wings - Breast not supported 1 chicken right & 1 chicken wrong fixed	45.4	22.3	0.12	0.4	22.4	NA	<0.001
	38.7	NA	0.075	0.3	NA	NA	0.002
	0	6.7		0	6.1	NA	
	NA	19.9		NA	16.7	NA	
	NA	5.8		NA	NA	NA	
	NA	0.9		NA	3.6	NA	
Escaped chickens per container/crate (%)	0.8	0.2	0.3	1.0	0.3		0.15
Trapping process assessment (1-7) - Loudness - Animal behaviour - Efficiency process	4.8	4.6	<u>0.08</u>	4.5	3.8	4.8	<u>0.05</u>
	4.8	4.3	0.16	4.5	4.0	4.3	0.34
	3.3	4.3	0.17	3.3	4.0	2.3	<u>0.05</u>

RESULTS - Measures at slaughterhouse

LAYERS	Inverted (n=16522)	Upright (n=16990)
Average injuries (%)	7.9	7.1
Injuries (%):		
Bruising wings	1.73^a	1.13^b
Broken wings	0.06	0.06
Bruising on wingtip	3.66	3.48
Bruising chest	0.95	1.06
Bruising legs	1.52	1.41
Broken legs	0.01	0.01

BROILERS	Inverted (n=45350)	Upright (n=45640)	Mechanical (n=12210)
Average injuries (%)	16.8^a	15.4^b	15.1^c
Injuries (%):			
Bruising wings	6.24	5.37	4.44
Broken wings	0.56	0.55	0.38
Bruising on wingtip	4.45	4.39	3.23
Bruising chest	2.19	2.10	0.59
Bruising legs	3.31^(a)	2.99^(a)	2.44^(a) (P=0.090)
Broken legs	0.04	0.03	0.02

LAYERS - Costs

Average 21	Inverted (euro)	Upright (euro)	Difference (euro)
Labour catch team (€40/hour/person)*	206.5	369.4	162.9
Transport (€75/hour)**	18.8	29.8	11.0
Total cost 1000 chickens	225.3	399.2	173.9
Total cost 20,000 chickens	4506	7984	3478
Total cost of catching 1 chicken	0.23	0.40	0.17
Cost per egg***	0.0006	0.0011	0.0005

*Average # of man hours worked per method per 1000 chickens

**Average duration per trapping method per 1000 hens

***total number of eggs per hen in her lifetime (360)

Box of 6 eggs: **€1** (conventional) → **€1.003** (upright)

BROILERS - Costs

Average	Inverted (euro)	Upright (euro)	Mechanical (euro)	U-I (euro)	U-M (euro)	I-M (euro)
Labour catching team(€40/hour/pers)*	43.4	67.2	NA	23.8	NA	NA
Loader (forklift) catching team (€70/hour)**	8.7	12.5	NA	3.8	NA	NA
Transport (€80/hour)**	10	14.3	10	4.3	4.3	0
Cost of catching machine***	NVT	NVT	515	NA	NA	NA
Total cost 1000 chickens	62.1	94	525	31.9	NA	NA
Total cost 20,000 chickens	1242	1880	1570	638	310	-328
Total cost of catching 1 chicken	0.062	0.094	0.078	0.032	0.016	0,016
Cost per kg live weight****	0.022	0.034	0.028	0.012	0.006	-0,006

*Average # of man hours performed per method per 1000 chickens
**Average duration per catching method per 1000 hens
*** Price per chicken: €0.045, Travel expenses: €125, Delivery & collection (3.5 hours*€70): €245 and Cleaning & greasing (2.5 hours*€40 s): €100
**** meat chicken (2.8 kg)

1 kg chicken breast: €3 (conventional) → €3.012 (upright)

CONCLUSIONS - Layers

	Upright vs. Inverted
Duration (same # of catchers)	1.7 times longer
Cost Catching & loading (20,000 chickens) Additional cost per egg	+ € 3478 + € 0.0005
Ergonomics	• Ergonomist: too burdensome (both methods) • Catchers: less good
Animal welfare	• Less bruising wings • Less flapping • Shorter fixation time • <i>Less stress than inversion (prior knowledge of literature)</i>

CONCLUSIONS - Broilers

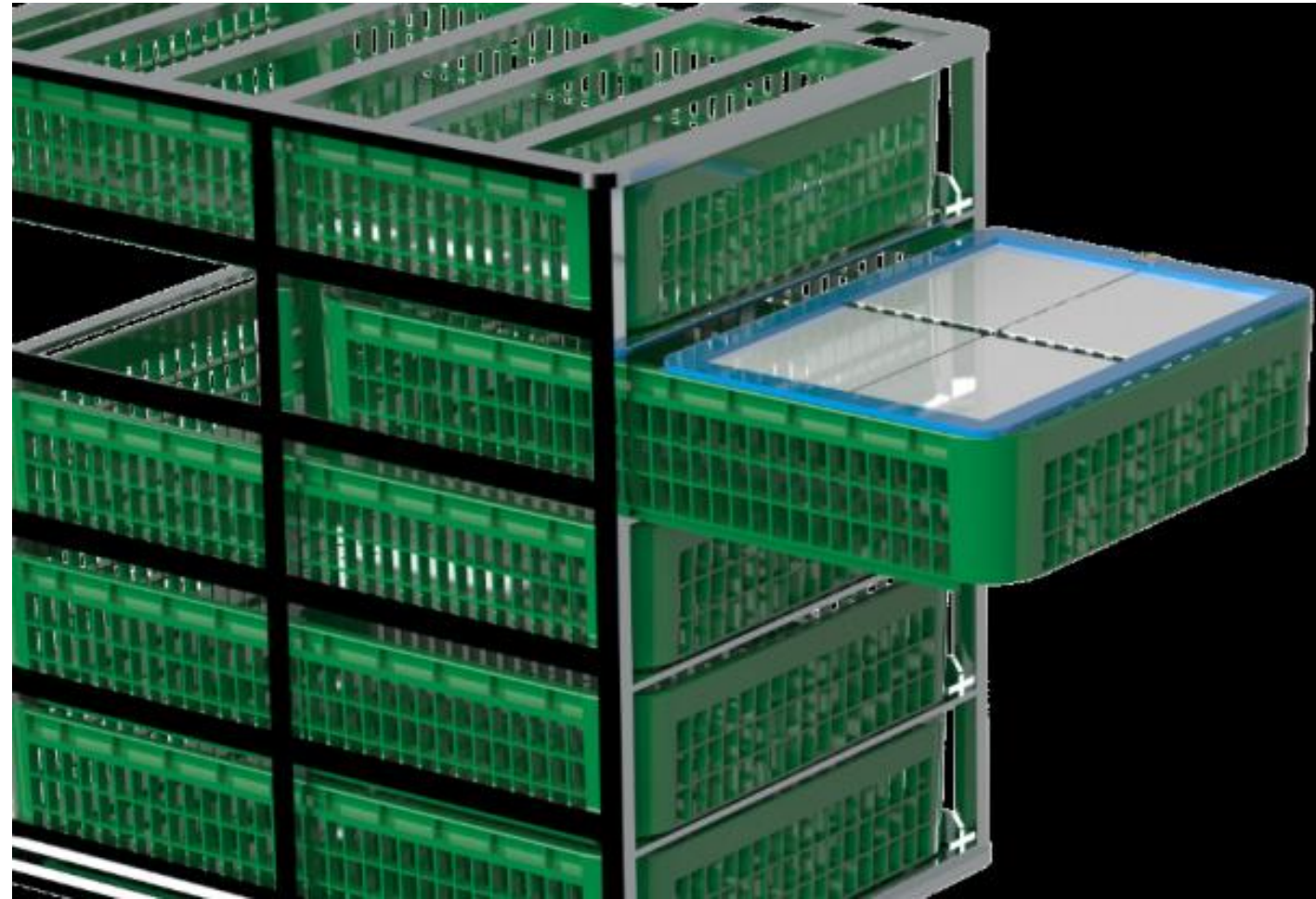
	Upright vs. Inverted	Upright vs. Mechanical	Mechanical vs. Inverted
Duration (same # of catchers)	1.5 times longer	1.5 times longer	≈
Cost Catching & loading (20,000 chickens) Additional cost/kg live weight	+ € 638 + € 0.012	+ € 310 + € 0.006	+ € 328 + € 0.006
Ergonomics	• Ergonomist: too burdensome (both methods) • Catchers: less good	• More labour-intensive (upright)	• More labour-intensive (conventional)
Animal welfare	• fewer total injuries • Less flapping • Shorter fixation time • <i>Less stress than inversion (prior knowledge of literature)</i>	• More total injuries	• Fewer total injuries • <i>Less stress due to no inversion (prior knowledge of literature)</i>

Add-ons for container (layers)

Student: Wout Verroens,

Promoters: Jan Detand & Femke Delanglez

Funding: UFAW



D. CULLING & SLAUGHTER: 2 REVIEWS FOR SELF-STUDY

SCIENTIFIC OPINION



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Killing for purposes other than slaughter: poultry

<https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2019.5850>

For the exam:
learning material limited to

1. Summary
2. Conclusions
3. Recommendations

Poultry Welfare at Slaughter

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