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Comparing traditional and modern methods for Arabian camel identification

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Introduction

- Camels are **hard to identify** (ID) due to their features (i.e., uniform coat colors, small ears and long neck, wool…).
- Traditional ID is done as an ownership mark using **hot iron brands** (the "***wasm***") on not woolly places (e.g., cheek, neck, shoulder, thigh).
- "Wasm" is **not compatible** with current **animal welfare** standards and of few utility when **used for ID at national level** for health, genetic and traceability programs.



Objectives

To evaluate the performances of **3 ID systems** for **Arabian camels** (n = 477) of different **breeds** (n = 4), **ages** (1 wk of age to adult) and at **3 geographical locations** with different exploitation **conditions:**

The ID systems were:

1) **Hot iron branding** (old camels).
2) **Plastic ear tags**: 2 types (all ages).
3) **Electronic boluses**: 7 types (all ages).

The geographical locations were:

1) **Egypt** (Exp. 1)
2) **Spain** (Exp. 2)
3) **Saudi Arabia** (Exp. 3).

Material & methods: ID devices

- **Hot iron brands:** Old camels of Exp. 1 (n = 45) previously branded at yearling (1 to 3 digits, 20 cm high).
- **Plastic ear tags:** All camels, different ear tags according to farm.
- **Rumen boluses of different features:** Cylindrical capsules of different dimensions and materials to reach 2 ranges of specific gravity:

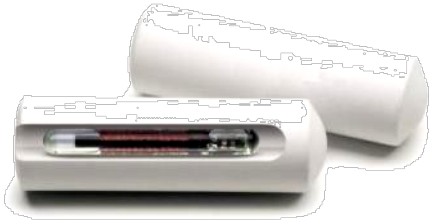
Bolus type	L × d (mm)	Weight (g)	Volume (ml)	SG[1]
B1[2]	15 × 51	12.7	8.5	**1.49**
B2 (mini)[3]	11 × 56	20.1	5.2	**3.86**
B3[2]	21 × 67	33.3	22.1	**1.51**
B4[4]	17 × 68	51.4	14.3	**3.59**
B5[3]	21 × 66	65.2	21.0	**3.10**
B6 (standard)[3]	21 × 68	75.1	22.4	**3.35**
B7 (heavy)[3]	21 × 69	82.1	22.8	**3.60**

[1]SG = specific gravity (W/V); [2]Prototypes made from plastic tubes filled with concrete; [3]Ceramic boluses (Rumitag, Esplugues de Llobregat, Barcelona, Spain); [4]Ceramic boluses (Innoceramics, Teramo, Italy).

- All boluses contained a **32 × 3.8 mm HDX radiofrequency transponder** (Ri-Trp-RR2B-06, Tiris, Almelo, the Netherlands) working at a low frequency (134.2 kHz).

Camel forestomachs and bolus administration

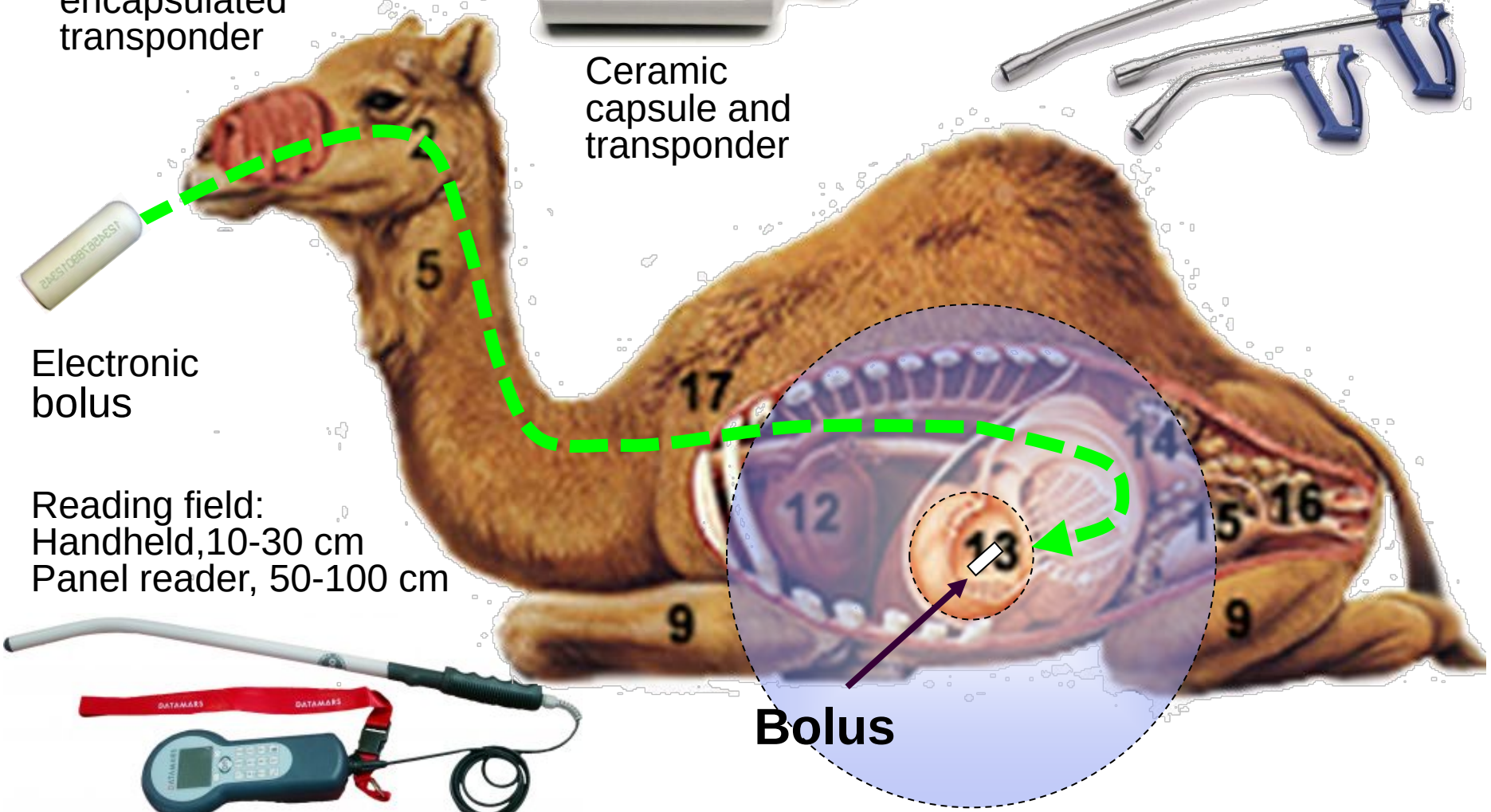
Glass encapsulated transponder



Ceramic capsule and transponder

Bolus guns

Electronic bolus



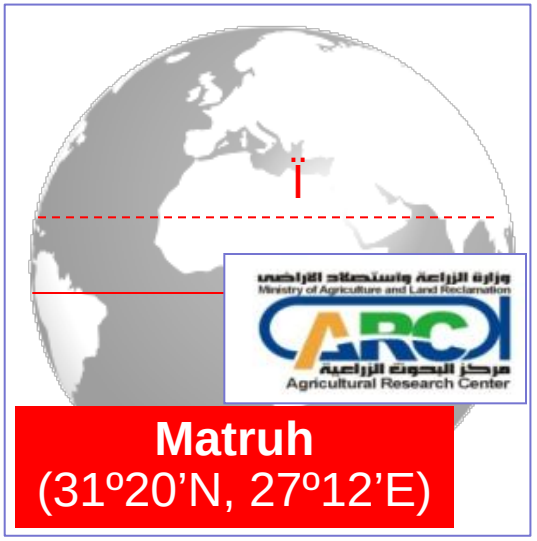
Reading field:
Handheld,10-30 cm
Panel reader, 50-100 cm

Material & methods: Exp. 1 (Egypt)

- **83 Maghrebi** dairy camels (5.7 ± 0.5 yr; 1 to 14 yr) and 444 ± 16 kg BW; 59 60 691 kg BW) at the APRI Camel Research Station (Marsa Matruh, Egypt).

Identified with:

- **Iron brands** (3 digits, 20 cm high) in the left thigh (yearlings, n = 45).
- **Ear tags** (rectangular 2 plastic flaps,15×50 mm, 3 g)
- **Electronic boluses of 5 types: B1, B2, B3, B4, B6**
- Loose stalls and fed Bersim hay, saltbush, rice straw, and 12% CP concentrate.



Material & methods: Exp. 2 (Spain)

- **304 Canarian** suckling (0-12 mo), replacement (1 to 5 yr), working and dairy (6 to 19 yr) camels at the Oasis Park (Fuerteventura, Canary Islands, Spain).

Identified with:

- **Ear tags** (plastic button ear tags, 28.5 mm diameter, 3.5 g).
- **Electronic boluses of 4 types: B2, B5, B6, B7**.
- Loose stalls (fed alfalfa hay, barley straw, corn grain and a concentrate) and grazing on salty bushes.

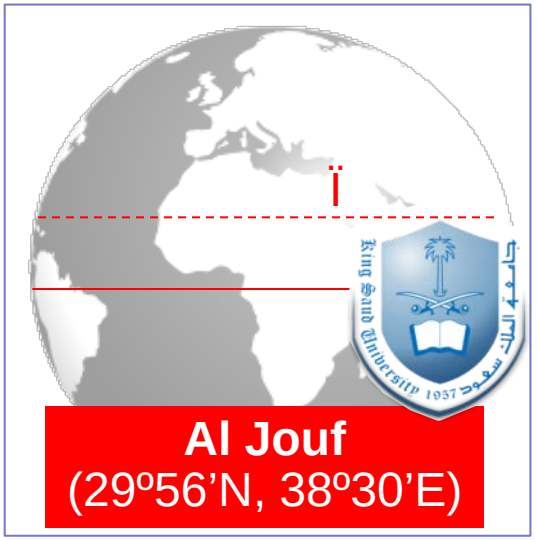
Fuerteventura
(28º11'N, 14º9'O)

Material & methods: Exp. 3 (Saudi Arabia)

- **90 Arabian** dairy camels (**Maghatir**-white, n = 37; **Majahim**-black, n = 53) at a commercial dairy farm (Al Watania, Al Jouf, Saudi Arabia).

Identified with:

- **Ear tags** (plastic band tags, weight, 2.0 g; length × width, 75.5 × 9.0 mm). Retention not recorded.
- **Electronic boluses** of **type B6**.
- Loose stalls (fed corn stalks, corn cobs, barley straw) and grazing on stubbles.



Material & methods: Readability & Statistics

- **Ear tag retention and readability** were recorded at the end of the experiment (2 yr).
- **Electronic boluses** were read at **d 0, 1, 2, 7, 14, 21, 32, 61** and approximately **every 2 mo until 2 yr** using handheld transceivers (Gesreader Ges2S and Ges3S; Datamars, Bedano, Switzerland). Reading data were downloaded by using Rumisoft (Datamars) software.
- **Statistical analyses:**
  Readability (0 or 1) of different devices was analyzed with the PROC **CATMOD** of SAS (v. 9.1; SAS Inst. Inc., Cary, NC, USA) using a **Logit model** with an estimation method of maximum likelihood.

Results (1): Iron brands

- Clear signs of **healing problems** were detected in **18%** of camels as a consequence of **hot iron branding**.
- Only **38% hot iron** branded numbers were able to be fully read, dissuading of using it as reference ID.

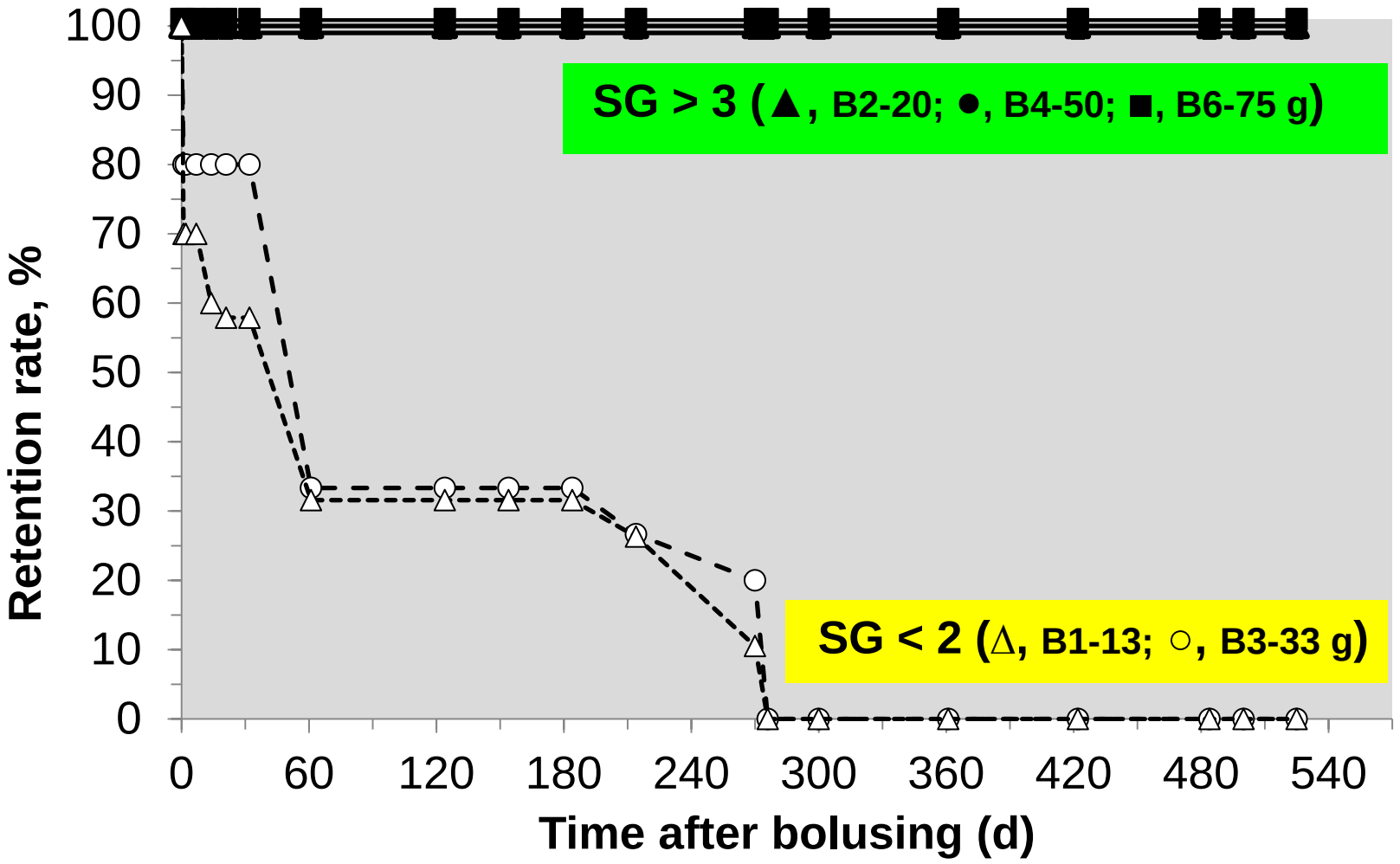
Results (2): Plastic ear tags

- Retention was **lower in rectangular vs. button** ear tags (66.0 vs. 81.1%; $P < 0.01$).
- Lost ear tags were associated with ear breakages or with infected ear wounds.

Results (3): Electronic boluses

- **Bolus retention rate varied** markedly ($P < 0.001$) **according to SG (w/v)** :
  - SG < 2 (0 to 80%, depending on time)
  - SG > 3 (98 to100%, depending on size)
- Boluses were **administered safely** at all ages, but 2 standard boluses (B6, 21 × 68 mm) were blocked at the diaphragmatic hiatus in 2 camel calves (70 kg BW) needing a probe to be unblocked.
- Despite their weight (range 20 to 75 g), **no losses were** reported for all types of **high SG boluses** (SG > 3) **from suckling to adult** camels.

Retention rate of electronic boluses according to their specific gravity (SG) in dromedaries (Exp.1)



Readability of electronic boluses in camels according to bolus type and Exp. Location (n = 477)

Country (Exp.)	Bolus type	n	Weight (g)	Volume (ml)	SG (w/v)	Readability (%)
Egypt (Exp.1)	B1	20	12.7	8.5	1.49	0
	B2 (mini)	17	20.1	5.2	3.86	**100**
	B3	15	33.3	22.1	1.51	0
	B4 (small)	16	51.4	14.3	3.59	**100**
	B6 (standard)	15	75.1	22.4	3.35	**100**
Spain (Exp.2)	B2 (mini)	82	20.1	5.2	3.86	97.8
	B5	39	65.2	21.0	3.10	**100**
	B6 (standard)	125	75.1	22.4	3.35	**100**
	B7 (heavy)	58	82.1	22.8	3.60	**100**
Saudi Arabia (Exp.3)	**B6 (standard)**	90	75.1	22.4	3.35	**99.0**

Conclusions

- No hot iron branding is recommended for camels
- Ear tag retention was unsatisfactory (66 to 81%), needing the use of a second ID system.
- Bolus retention varied dramatically according to SG agreeing previous data obtained in cattle, sheep and goat.
- High SG boluses (>3) were fully retained (>99%) in camels independently of their dimensions (small to large) and weight (20 to 75 g) and are recommended in practice.
- Bolus administration must be done by trained operators and miniboluses should be applied in camel calves (<90 kg BW) at early ages (<3 mo).

Thanks for attention!

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MINISTERIO DE ASUNTOS EXTERIORES Y DE COOPERACIÓN
Agencia Española de Cooperación Internacional para el Desarrollo

Oasis Park FUERTEVENTURA