Light-treated rams and bucks abolish reproductive seasonality in sheep and goats

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1. Seasonality of breeding is a trait of temperate and subtropical sheep and goats, which has major technical and economical consequences.

2. In males and females, photoperiod imposes male sexual rest and cessation of ovulatory and oestrus activities during 5-6 months in spring and summer, in breeds of these latitudes.

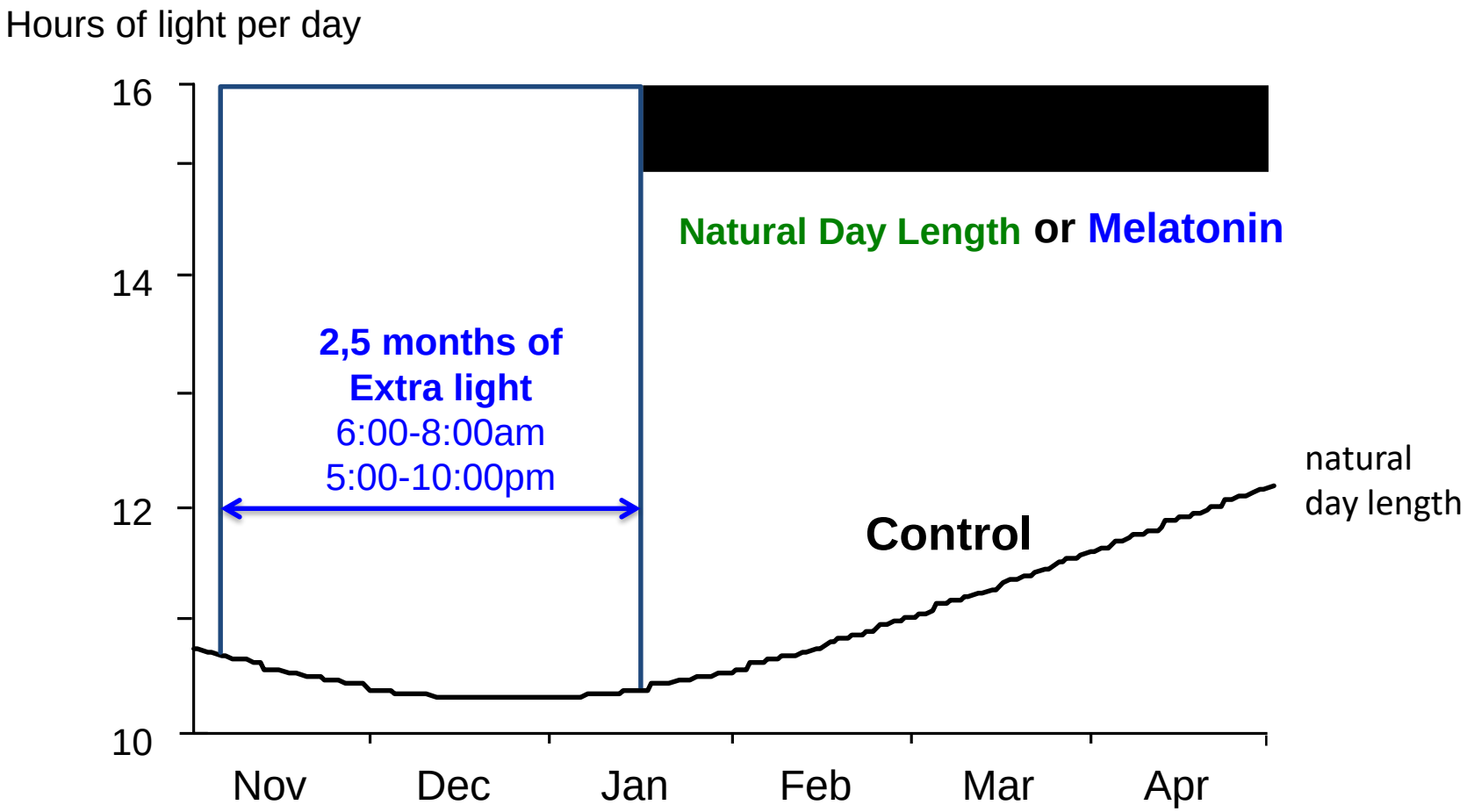
3. Recently, we showed the high efficiency of light-treated sexually-active rams and bucks to :

(a) abolish the seasonality of breeding in females

(b) improve the efficiency of the "male effect"

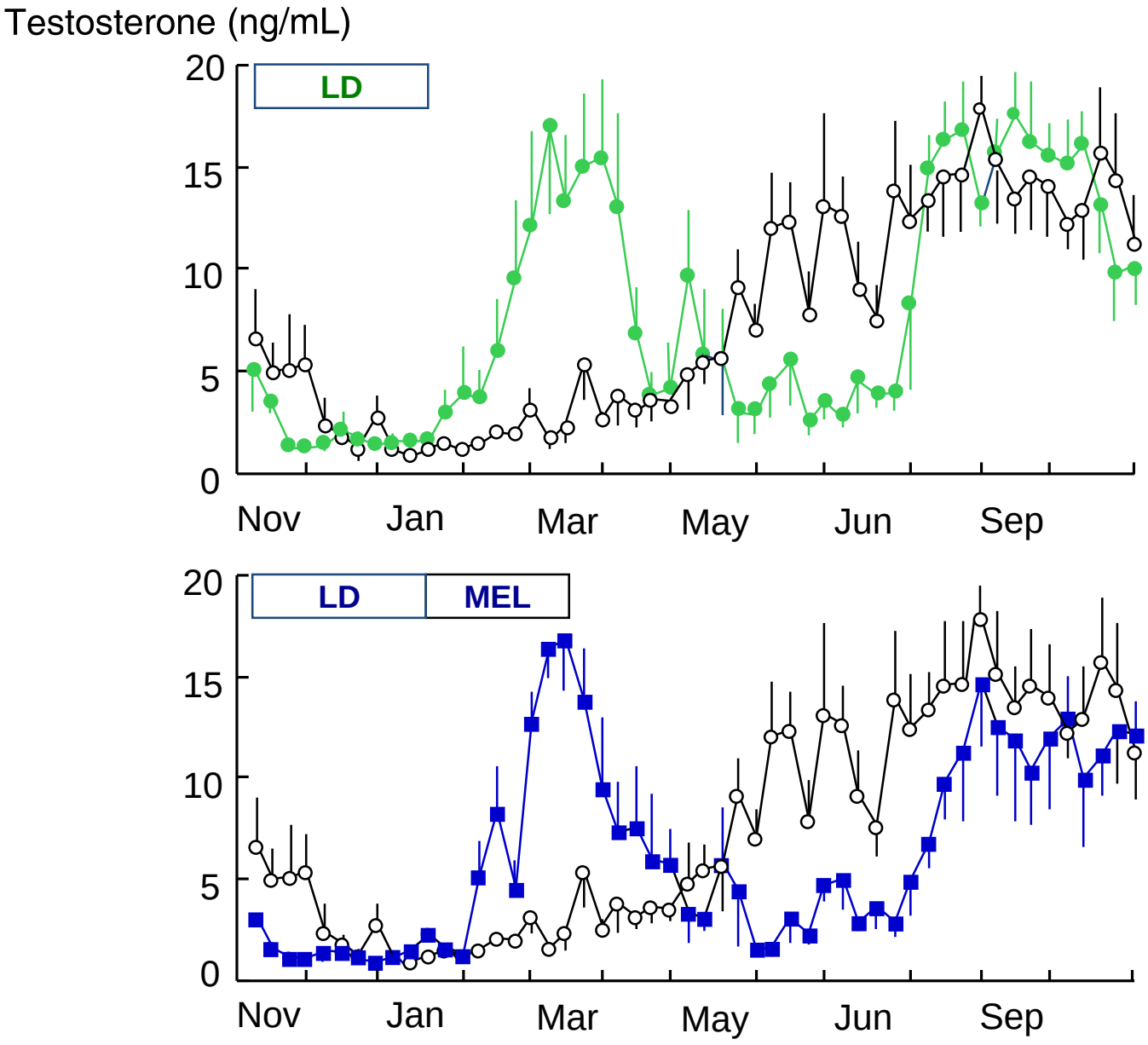
Treat the males with extra-light: a technique simple, cheap and efficient to stimulate sexual activity

Extra-light treatment



(Delgadillo et al., 2002)

Testosterone response to extra-light treatment (bucks México)



(Delgadillo et al., 2002)

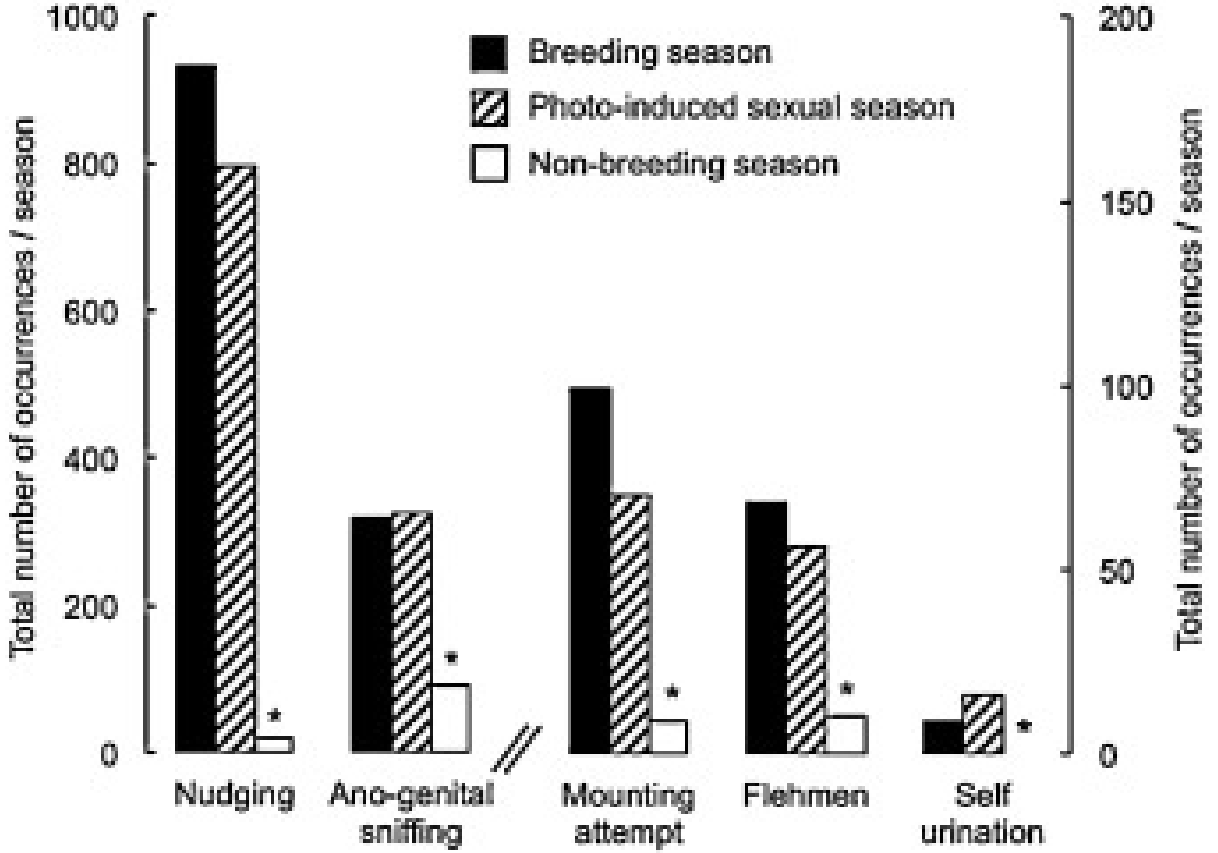
Inactive male

Delgadillo JA CIRCA Mex

Sexually active male

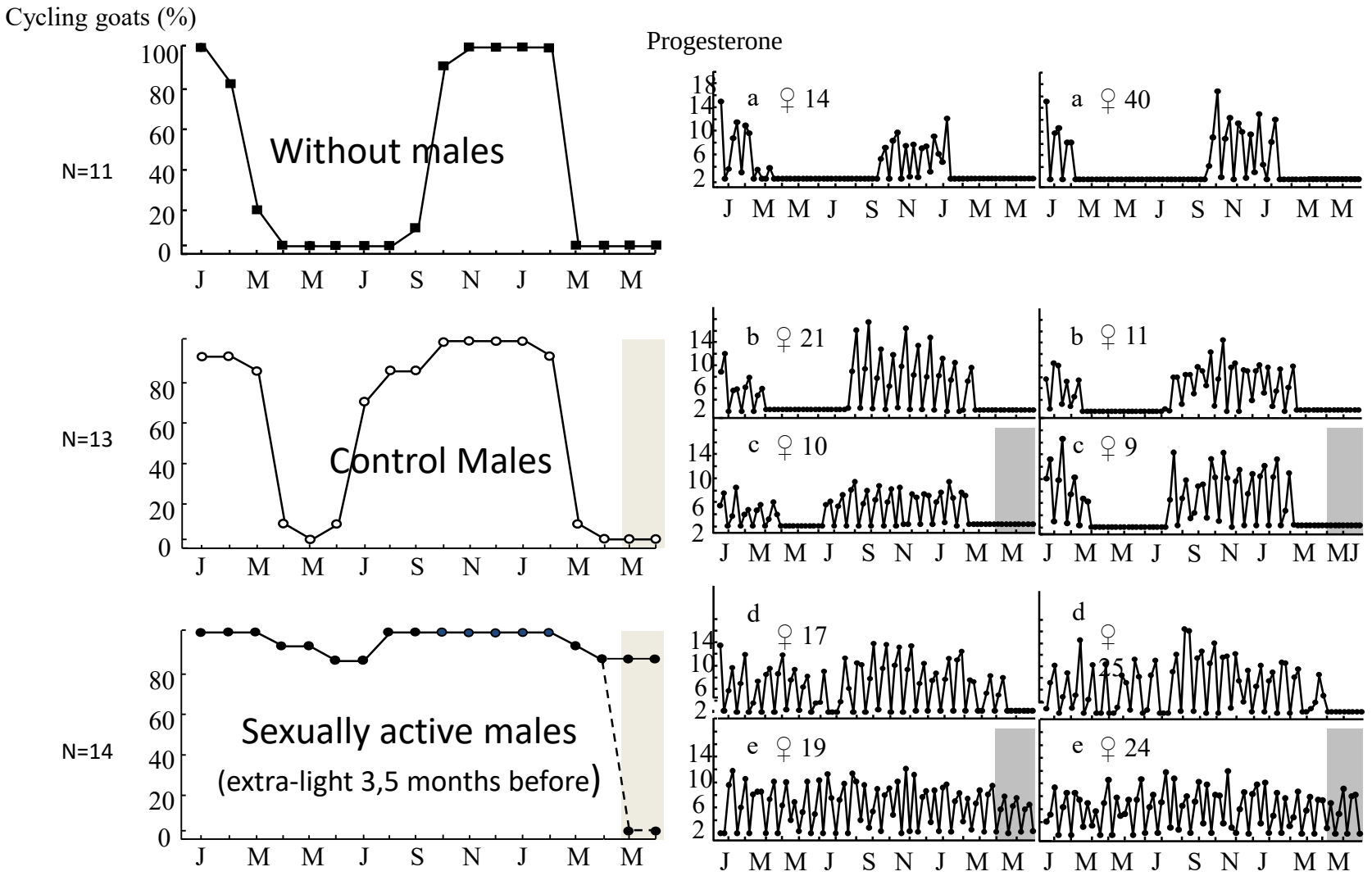
Delgadillo JA CIRCA Mex

Sexual behavior of bucks during their breeding season, after they were submitted to a photoperiodic treatment and during their non-breeding season (Mexico)



Bedos et al 2016

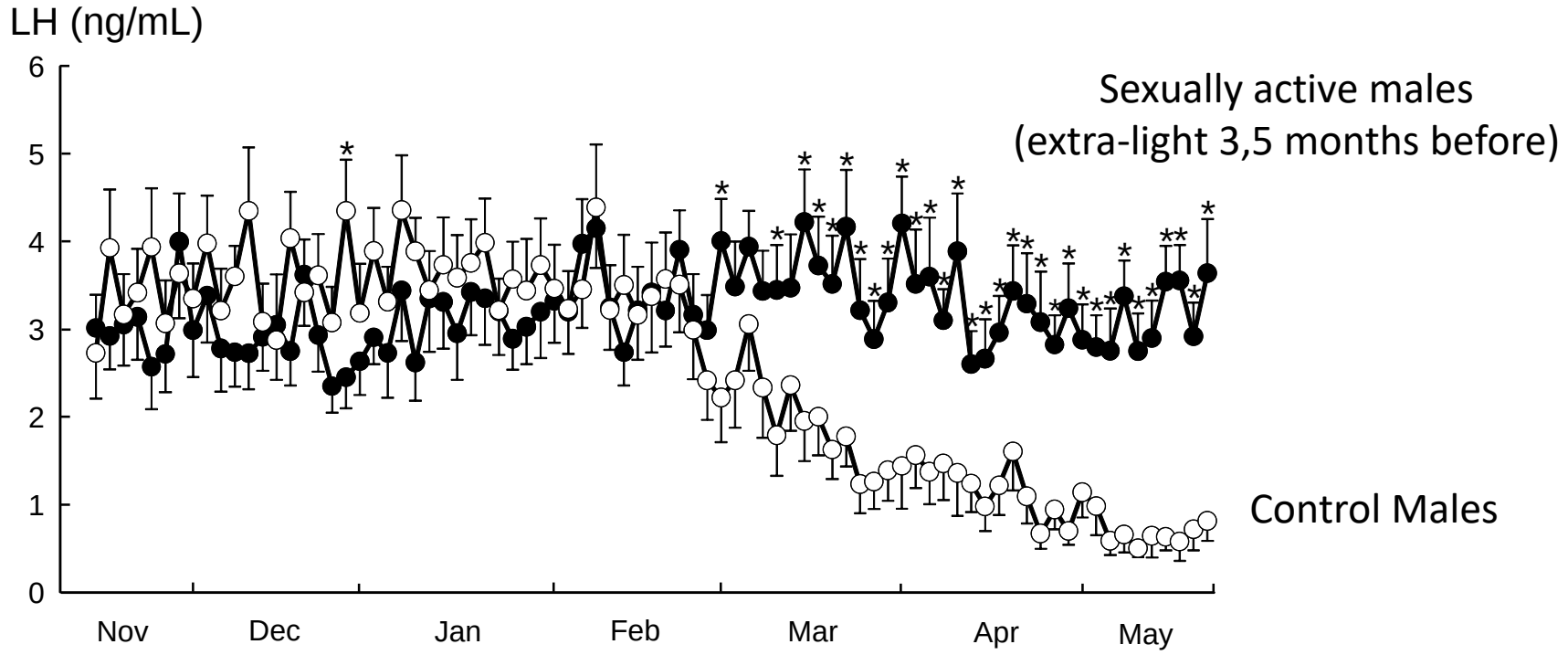
(a) Sexually active males completely prevent seasonal anoestrus (goats = cows !)



Delgadillo J.A. et al. 2015 Hormones & Behavior

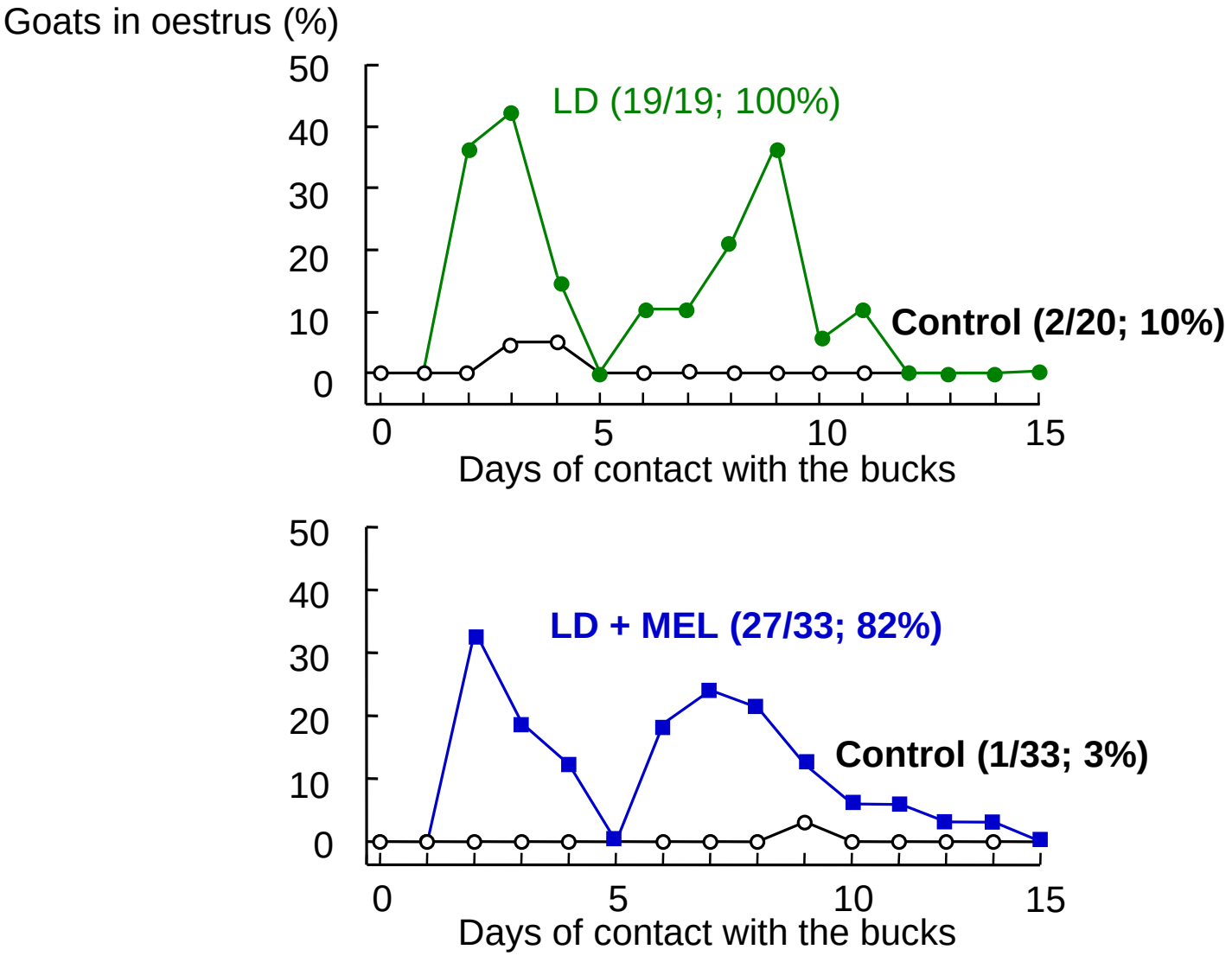
(a) Sexually active males act centrally

Plasma LH in Ovariectomized + E2 goats



Muñoz AL et al. 2017 Dom. Anim. Endocr.

(b) Sexually active males dramatically improve efficiency of the "male effect"



(Flores et al., 2000; Delgadillo et al., 2002)

Use of light-induced sexually active rams in Spring, in a ram effect in Rasa Aragonesa ewes (Spain)

	Fertility % Ewes lambing	Prolificity Lambs/Lambing	Fecundity Lambs/ewe joined
Ram effect with control rams (N=18)	78	1,29	1,00
Ram effect with light-induced rams (N=17)	100	1,44	1,44
	P<0.05	NS	P<0.05

(Abecia et al., 2017)

Use of light-induced sexually active rams in Spring, in a ram effect in Churra ewes in an organic farm (Spain)

	Fertility % Ewes lambing	Prolificity Lambs/Lambing	Fecundity Lambs/ewe joined
Ram effect with control rams (N=72)	42	1.13	0,47
Ram effect with light-induced rams (N=72)	68	1.18	0.81
	P<0.001	NS	P<0.002

(Abecia et al., 2017)

Potential technico-economic benefits in Mexico

- Sexually active bucks are now used in the "Comarca Lagunera":

- 80 bucks a year are now treated using the CIRCA method and spread in about 300 flocks

- this technique reduced kid mortality (-15%), lengthened lactation (+ 3months) and increased mik production

- The efficiency at the regional level could be very high:

Hyp 60% penetration	per goat	per flock/farmer (70 goats/flock)	for Comarca Lagunera
Increase in income in Euros (€) per year	+ 24 €	+ 3 400 €	+ 12 millions €

Conclusion
(take-home messages)

Light-treated sexually-active rams and bucks :

1. abolish the seasonality of breeding in females

2. dramatically enhanced the response of ewes and goats to the “male effect”

Thanks for your attention

any question, comment ?