INFLUENCE OF ECOLOGICAL FACTORS AND REPRODUCTIVE SEASONALITY IN WILD BOAR FROM THE DAGÂȚA AND STRUNGA HUNTING GROUNDS, IAȘI COUNTY, ROMANIA

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Abstract

Reproductive timing in wild boar (Sus scrofa ferus) is classically constrained by short-day photoperiod, yet growing evidence shows marked ecological plasticity. We compared two hunting grounds in Iași County, Romania-F.C. 55 Dagâța (hilly, mixed agro-silvopastoral mosaic) and F.C. Strunga (lowland, more uniform agricultural matrix)-to test whether local resource context modulates reproductive seasonality.

Between 2021–2023 we examined 12 free-ranging wild boar (6/fond; juveniles and adults, both sexes). Age was assigned by dentition; body condition was noted at necropsy. We assessed reproductive status by macroscopic and histological endpoints: in females, ovarian cyclicity (dominant follicles, corpora lutea, luteal activity) and uterine changes; in males, testes weight/consistency and seminiferous epithelium activity (spermatogenic stage prevalence). Observations were integrated with concurrent ecological descriptors (habitat structure, trophic context) documented for each fond.

In Dagâța, adult females frequently showed evidence of ovarian activity outside the classic winter breeding peak, including active corpora lutea in summer, while adult males retained functionally active spermatogenesis into the warm season-indicating an extended breeding window. In Strunga, estrus in females and peak testicular activity in males were tightly concentrated in winter, consistent with strict seasonality. Across specimens, reproductive status co-varied with body condition and the local resource profile: steadier, diverse foraging in Dagâța vs. comparatively constrained resources in Strunga.

Key words: *seasonality, reproduction, wild boar*

INTRODUCTION

Wild boar *(Sus scrofa ferus*) are short-day seasonal breeders whose reproductive timing is classically synchronized to autumn–winter [1]. Yet the species' exceptional trophic plasticity allows ecology to modulate this schedule. In landscapes with stable, energy-rich resources (e.g., agro-mosaics, supplemental feeding), females may cycle earlier [10] or longer and males may sustain spermatogenesis beyond the canonical peak [5]; in poorer or highly seasonal habitats, reproduction remains tightly winter-centric. Understanding how local habitat structure reshapes reproductive seasonality is essential for accurate population forecasts and evidence-based game management [7].

Iași County, Romania, provides a natural comparison. F.C. 55 Dagâța is a hilly, mixed agro-silvopastoral environment with diversified and relatively steady

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foraging opportunities, whereas F.C. Strunga lies in a more uniform lowland matrix where resources are comparatively constrained outside crop availability windows. These adjacent but contrasting hunting grounds offer an ideal setting to test whether fine-scale ecological context alters the timing and duration of reproductive activity in free-ranging wild boar [8].

This study addresses three gaps: (i) the paucity of paired, habitat-level comparisons of reproductive status in neighboring populations; (ii) limited integration of macroscopic and histological indicators (ovarian cyclicity, corpora lutea, testicular activity) with simple condition metrics; and (iii) the need to translate ecological signals into practical guidance for harvest timing and population control [4,6].

Objectives. We (1) characterize female and male reproductive status across seasons in Dagâța versus Strunga; (2) relate these endpoints to local habitat context and body condition; and (3) evaluate whether ecology extends or constrains the breeding window at the scale of hunting grounds.

Working hypotheses. We expect Dagâța to show a broadened reproductive window (summer ovarian activity in females; sustained spermatogenesis in males) due to steadier trophic inputs, and Strunga to exhibit strict winter seasonality. We further anticipate that adults, particularly in good condition, will display the strongest departures from the canonical pattern, while juveniles will show limited reproductive activation outside winter.

By linking reproductive timing to tangible habitat differences within a single region, the study aims to provide an ecologically grounded explanation for local variability in wild boar productivity and to inform adaptive, season-aware management.

RESULTS

We examined twelve free-ranging wild boar collected between 2021 and 2023 from two contrasting hunting grounds in Iași County (six from F.C. 55 Dagâța; six from F.C. Strunga), with representation of adults and juveniles of both sexes across spring–summer and autumn–winter. Reproductive status was assessed macroscopically and histologically in ovaries/uterus (females) and testes (males).

In Dagâța, evidence pointed to a broadened reproductive window. The adult female sampled in midsummer (july) displayed functional ovarian activity outside the canonical short-day peak, with active corpora lutea and luteal vascularization accompanied by a moderately thickened endometrium. The adult female examined in late autumn (november) also showed luteal phase features consistent with in-season reproduction. Adult males collected in early and late summer (June and August) had turgid testes with a full spermatogenic series, including late spermatids, indicating maintained spermatogenesis through the warm season. The juvenile male from October showed reduced tubular diameters with predominantly spermatogonia/early spermatocytes, consistent with immaturity, and the juvenile female from November lacked corpora lutea, as expected for peri-pubertal status.

In Strunga, reproductive activity was more tightly winter-centric. The adult female examined in January exhibited robust luteal activity (multiple corpora lutea) and a congested, luteal-phase endometrium, while two juvenile females sampled in May and September showed only small antral follicles without corpora lutea, indicating absence of off-season cycling. Among males, the January adult presented peak spermatogenesis with abundant late spermatids/spermatozoa and maximal seminiferous epithelial thickness; the adult collected in September showed incipient, pre-rut activation (progressing meiosis but fewer late spermatids than in January), and the juvenile from April remained immature.

Across both hunting grounds, age class modulated absolute values as expected-juveniles lacked corpora lutea and showed immature testes-while adults in better body condition were more likely to exhibit active gonads at the time of sampling. These demographic effects, however, did not obscure the dominant habitat signal: Dagâța, with a more diversified and steady resource base, supported detectable ovarian and testicular activation into summer, whereas Strunga conformed to a narrow winter peak. Overall, the data indicate ecology-dependent modulation of reproductive seasonality, with Dagâța showing summer-into-winter activation and Strunga expressing a strict cold-season schedule.

DISCUSSIONS

The comparative evidence from Dagâța and Strunga supports a clear, ecology-dependent modulation of reproductive seasonality in wild boar. In Dagâța, where trophic inputs are more diverse and relatively stable across seasons, adults of both sexes exhibited reproductive activation beyond the canonical short-day window-corporea lutea in midsummer females and fully active spermatogenesis in summer males. In Strunga, with a more uniform and comparatively constrained resource base outside crop windows, reproductive activity aligned tightly with winter, and off-season activation was absent in females and only incipient in a September male. This contrast indicates that photoperiod sets the basic template for timing, but energetic context and diet quality can relax or reinforce that template locally [2].

Mechanistically, the Dagâța pattern is consistent with energetic gating of reproduction: higher and steadier energy intake sustains leptin–insulin cues to the hypothalamic–pituitary–gonadal axis, lowering the threshold for ovarian cyclicity and maintaining spermatogenesis despite long days. In Strunga, energetic constraints outside winter likely keep that threshold higher, so the same photoperiodic signal produces a narrower, winter-centric breeding window. The agreement across sexes argues for a system-level response rather than sex-specific idiosyncrasies.

Age effects behaved as expected: juveniles showed immature gonads and no corpora lutea, indicating ongoing maturation and a stronger dependence on favorable cues before activation. Among adults, better body condition coincided with active gonads, reinforcing the role of nutritional status as a proximal driver. Notably, the Strunga adult sampled in early autumn showed partial testicular activation, suggesting that local crop availability can prime the system ahead of winter but does not fully override seasonal constraints [3].

Alternative explanations merit consideration. Short-term feeding history, mast years, or recent access to crops could transiently elevate endocrine tone and mimic an “extended season,” while post-mortem interval and fixation quality may subtly affect histological endpoints. Small, stratified sample sizes limit inference about interactions (fond × age × sex), and cross-sectional data cannot disentangle plasticity from selection. Even so, the directional consistency-summer activation in Dagâța vs. winter-peaked activity in Strunga-across multiple individuals and endpoints argues against artefact.

The ecological signal also aligns with the broader anatomical profile documented for these same specimens: Dagâța animals show traits that favor processing of fibrous, variable diets (e.g., thicker colonic walls, denser small-intestinal villi), while Strunga animals show a more volumetric, enzyme-oriented profile (e.g., larger gastric/intestinal capacities and wider colonic lumen). This coherence suggests that digestive morphology and reproductive timing are coordinated components of a

single adaptive strategy tuned to local resource regimes [9].

From a management perspective, the findings imply that harvest timing and effort allocation should be habitat-specific. In Dagâța-like mosaics, extended reproductive activity increases the probability of off-season pregnancies; protecting leading sows and avoiding peak farrowing windows may help stabilize recruitment. In Strunga-like settings, effort can focus on the narrow winter peak while monitoring crop-driven priming in early autumn. More broadly, supplemental feeding or persistent crop access is likely to dilate the breeding window, accelerating population growth and conflict risk.

Future work should (i) scale up sample sizes across seasons, (ii) pair histology with functional markers (fecal/plasma steroids, semen traits, ovarian follicle counts), (iii) quantify body-condition and diet proxies (fat scores, isotopes), and (iv) integrate remote sensing of food availability to formalize ecology–endocrine links. Such data would convert the present anatomical signals into predictive tools for population models and adaptive harvest planning.

Table 1 Influence of Ecological Factors and Reproductive Seasonality in Wild Boar from the Dagâța and Strunga Hunting Grounds.

Domain	Indicator (unit)	Dagâța (F.C. 55)	Strunga	Evidence / notes
Habitat–ecology	Landscape / resources	Mixed, agro-silvopastoral; diverse & steady	Lowland agricultural; more uniform & constrained	Field characterization
Photoperiod gating	Photoperiod constraint	Relaxed by resource stability	Strong; dictates winter peak	Timing of activation
Female status	Ovarian activity in summer (CL present)	Yes (July, adult ♀)	No detected	CL + luteal vascularization
Female seasonality	Estrus concentration	Extended window (summer → autumn/winter)	Winter-centric	CL across seasons
Juvenile females	Off-season cycling	Absent	Absent	Small antral follicles; no CL
Male status	Summer spermatogenesis (adult ♂)	Present (June & August)	Absent (Sept = partial pre-rut only)	Full series vs partial
Male seasonality	Peak testicular activity	Broad (summer maintained)	January peak	Late spermatids/spermatozoa
Condition link	Body condition ↔ activation	Positive association	Positive association	Better condition → active gonads
Overall seasonality	Breeding-window classification	Extended / broadened	Strict winter	Cross-sex synthesis
Management signal	Risk of off-season pregnancies	Higher (monitor summer–autumn)	Low (focus winter)	Align harvest timing

CONCLUSIONS

In summary, our data show that reproductive seasonality in wild boar is not dictated by photoperiod alone but is modulated by local ecology. In the mixed, resource-stable landscape of Dagâța, adults of both sexes displayed a broadened breeding window: females with luteal

activity detected even in midsummer and males maintaining functional spermatogenesis through the warm season. By contrast, Strunga-more uniform and comparatively constrained outside crop windows-exhibited a winter-centric schedule, with female estrus and peak testicular activity concentrated in the cold months and no off-season activation in females. Age and body condition shaped absolute values (juveniles remained immature; well-conditioned adults were more frequently active) but did not override the strong, fond-level signal.

The reproductive pattern aligns with the morphological profile documented in the same animals, suggesting a coordinated ecological syndrome: Dagâța individuals combine extended reproductive activity with digestive traits suited to fibrous, variable diets, whereas Strunga individuals pair winter-peaked reproduction with a more volumetric, enzyme-oriented gut morphology. From a management perspective, this implies that Dagâța-like mosaics warrant caution regarding off-season pregnancies and protection of leading sows near farrowing windows, while Strunga-like settings allow effort to focus on the narrow winter peak, with attention to early-autumn priming around crops. Although the sample is stratified but limited (n=12), the directional consistency across sexes and endpoints supports an ecology-dependent interpretation; expanded seasonal sampling with endocrine and diet proxies will refine effect sizes and strengthen predictions for adaptive harvest planning.

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