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ORIGINAL ARTICLE OPEN ACCESS

Performance of Beef Cattle Under Grazing as Affected by *Urochloa decumbens* Cultivars

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Received: 22 October 2025 | **Revised:** 2 March 2026 | **Accepted:** 13 March 2026

Keywords: canopy height | forage | nutritive value | plant-part composition | signal grass | stocking rate

ABSTRACT

Testing animal performance under grazing is fundamental to determine the potential of recently released, high-yielding *Urochloa decumbens* hybrids. The objective was to evaluate the weight gain of young bulls grazing on pastures of *U. decumbens* cultivars Basilisk, BRS Carinás, and BRS Poraitê, as well as to assess the nutritive value and plant-part composition of the forage. The experiment was conducted over 2 years in a clay soil, using a randomized block design with three replicates. Pastures were managed under continuous stocking with a variable stocking rate (SR), aiming to maintain a canopy height of 25 cm. In contrast to the leaf blade and stem, the amount of dead material increased from the rainy to the early dry season, with Basilisk showing a greater mean value (1314 kg DM/ha), followed by Poraitê (1150 kg DM/ha) and Carinás (1127 kg DM/ha) ($p < 0.10$). Carinás and Poraitê had slightly greater crude protein (CP) (114 g/kg) compared to Basilisk (105 g/kg), particularly during the first year. Animals grazing Carinás had greater average daily gain (ADG) (0.62 kg LW) compared to Poraitê (0.54 kg LW), and similar performance to Basilisk (0.59 kg LW). In terms of live weight gain per area (GA), Carinás outperformed the other cultivars, reaching 406 kg LW/ha/year, compared to 359 and 358 kg LW/ha/year for Basilisk and Poraitê, respectively, due to the greater ADG and the increased SR observed during the rainy season. Carinás and Poraitê have potential for promoting cattle growth, owing to their comparable forage quality and plant-part composition to Basilisk. However, the superior live weight gain per area observed for Carinás demonstrates its greater carrying capacity, without compromising individual animal performance.

1 | Introduction

The African forage species *Urochloa decumbens* (Stapf) R. Webster (syn. *Brachiaria decumbens*) is widely cultivated throughout the tropical regions of Latin America, Southeast Asia, and the South Pacific. The species is well adapted to low-fertility soils and resilient to overgrazing, maintaining much of its yield potential (Miles et al. 1996). On beef and dairy cattle farms, it is used in pure stands or in mixed grass-legume pastures (Gomide et al. 2001; Almeida et al. 2002; Garcia et al. 2004; Vieira et al. 2005; Lima et al. 2019). Furthermore, it has shown potential for silvopastoral systems (Santos et al. 2020; Silva et al. 2021; Carvalho et al. 2022; Díaz et al. 2025) and as a cover crop (Baptistella et al. 2022; Sousa et al. 2025). While hybrid cultivars have recently been developed for livestock and agricultural applications, information regarding animal performance under grazing remains unavailable.

The introduction of the cultivar Basilisk in Brazil in the 1970s was followed by outbreaks of spittlebug (*Aeneolamia*, *Deois*, and *Zulia* spp.; *Hemiptera: Cercopidae*), which subsequently reduced the use of *U. decumbens* after the release of the more resistant *Urochloa brizantha* cv. Marandu (López et al. 2009). Moreover, *U. decumbens* has been associated with hepatogenous photosensitization in cattle (<2 years old) and sheep, although cases have become increasingly sporadic, likely due to enhanced herd resistance and improved grazing management (Low 2015; Brum et al. 2009; Riet-Correa et al. 2011; Gracindo et al. 2014). Nonetheless, it is still among the most widely grown forage crops in central Brazilian states (e.g., Minas Gerais, São Paulo, Mato Grosso do Sul, Bahia) and a major export for the Brazilian seed industry, totaling approximately 0.92 million kg (Jank et al. 2014).

Basilisk is a decumbent and semi-erect cultivar with a shorter growth habit (0.5–1.5 m) than Marandu (0.6–2.0 m). It is characterized by vigorous tillering and dense ground cover, further supported by the presence of stolons (Portela et al. 2011; Pedreira et al. 2017). Although considered less demanding regarding soil fertility, it responds to nitrogen fertilization (Fagundes et al. 2005; Magalhães et al. 2007; Silva et al. 2012; Hanagasaki 2022). A study in Campo Grande, MS, Brazil, reported that while Basilisk yields slightly lower ADG in beef cattle than Marandu during the rainy season, it shows an advantage during the dry season, despite the overall seasonal decline in weight gain (Euclides et al. 2000). Due to its early flowering phenology (December/January), Basilisk is well-suited for stockpiling, a practice that enables the accumulation of forage for use during the dry season (Andrade et al. 2015; Amorim et al. 2019).

To provide cultivars better adapted to the Cerrado biome and more productive than Basilisk, the Brazilian Agricultural Research Corporation (EMBRAPA) released two new hybrids (*Urochloa decumbens* × *U. decumbens*) cultivars in 2025: BRS Carinás and BRS Poraitê. Both hybrids retain key traits that have made *U. decumbens* one of the most widely cultivated tropical forages, including high seed yield, adaptability to low-phosphorus soils, and a vigorous root system (Saraiva et al. 2014; Louw-Gaume et al. 2017; Canto et al. 2020). Furthermore, the hybrids have superior productivity, greater plant height, increased leaf width, enhanced stem thickness, and slightly improved resistance to spittlebugs compared to Basilisk (Oliveira et al. 2015; Mateus et al. 2015; Frontado et al. 2025). Carinás is genetically closer to Basilisk, resulting from a backcross involving two successive crosses, whereas Poraitê is a direct F1 hybrid.

It is hypothesized that Carinás and Poraitê cultivars reach, or even surpass, performance levels and environmental adaptability of cv. Basilisk under established grazing management protocols (Pedreira et al. 2017; Braga, Pedreira, et al. 2020). Therefore, the objective of this study was to evaluate beef cattle weight gain on pastures of *Urochloa decumbens*, Basilisk, Carinás, and Poraitê during the rainy and early dry seasons in the Cerrado biome, while also assessing forage nutritive value and plant-part composition.

2 | Materials and Methods

2.1 | Experimental Area

The study was conducted in Planaltina, Federal District, Brazil (15° 35′ S, 47° 42′ W; 993 m above sea level), on a very clayey Rhodic Haplustox Oxisol soil, between December 2022 and June 2024. The local climate is tropical with a dry winter (Aw), according to the Köppen classification (Alvares et al. 2013). The warm and rainy season occurs from October to April, as evidenced by monthly rainfall and average temperature data recorded at a meteorological station located 1400 m from the experimental site (Figure 1). The 0–20 cm soil layer had the following characteristics: pH_{CaCl2} 5.4; $P_{Mehlich\text{-}I}$ 2.74 mg/dm^3; S 16.1 mg/dm^3; K 0.32 cmol$_c$/dm^3; Ca 2.55 cmol$_c$/dm^3; Mg 0.95 cmol$_c$/dm^3; Al 0.09 cmol$_c$/dm^3; H + Al 3.82 cmol$_c$/dm^3; and organic matter 36.3 g/kg.

Between December 2 and 10, 2021, *Urochloa decumbens* (Stapf) R. Webster (syn. *Brachiaria decumbens*) was sown over a 12-ha

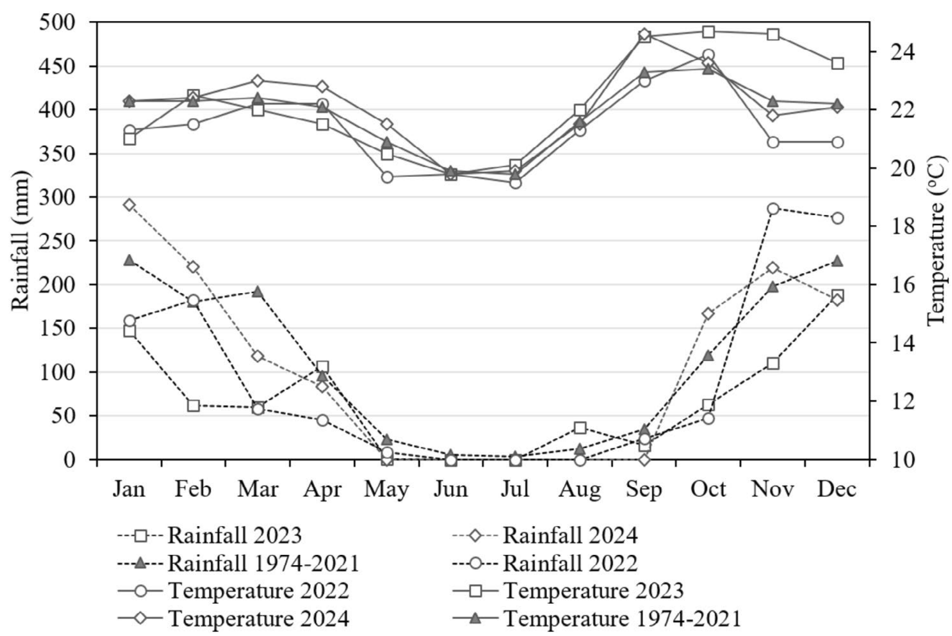

FIGURE 1 | Monthly rainfall and mean daily air temperature from 2022 to 2024, alongside the historical average rainfall and temperature (1974–2021) for Planaltina, FD, Brazil.

area using no-tillage on soybean (*Glycine max* L.) straw residue from the previous wet season. Seeds were sown at a rate of 3.5 kg/ha of pure live seeds, along with 50 kg/ha of P_2O_5 (single superphosphate, 18% P_2O_5) fertilizer, distributed in planting furrows spaced 0.25 m apart using a Semeato seeder. Following planting, fences, mineral salt troughs, and water troughs were installed across the experimental area. On January 22, 2022, the herbicide 2,4-D was applied to control invasive broadleaf plants. The first grazing event with Nellore (*Bos taurus indicus*) heifers occurred on March 4, 2022, to stimulate tillering via defoliation.

2.2 | Experimental Design, Grazing Management, and Fertilization

A randomized complete block design with three replicates was employed. Treatments consisted of three *U. decumbens* cultivars—Basilisk, BRS Carinás, and BRS Poraitê—distributed in three blocks with experimental units of 1.3 ha, maintained under continuous stocking with a variable stocking rate (SR) targeting a canopy height of 25 cm. Put-and-take animals (grazers) were added to or removed from pastures concurrently with the monthly weighing of all animals to maintain the target canopy height. Nitrogen and potassium fertilization (100 kg/ha N and 100 kg/ha K_2O, applied as a mixture) was top-dressed in two split applications on February 2, 2023, and February 7, 2024, using a Certeiro KF fertilizer spreader.

2.3 | Animal Performance

Three Nellore bulls per experimental unit, aged 12–15 months, served as test animals to evaluate average daily gain (ADG). Initial average live weights (mean ± standard deviation) of testers were 303 ± 12.3 kg in the first year and 220 ± 15.7 kg in the second year. Animals were weighed following a 16-h fast during two experimental years: January 4–June 29, 2023, and December 14, 2023, to June 12, 2024. In the first year, weighings were conducted on January 31, February 24, March 30, April 28, May 31, and June 29; in the second year, they were conducted on January 12, February 15, March 14, April 17, May 14, and June 12. From July onwards, performance evaluations were discontinued and all animals were removed from the experiment due to the dry season, which otherwise would have required significantly larger pastures and supplementation. The SR was calculated based on animal units (AU = 450 kg LW), considering both testers and grazers present in the pasture on each evaluation date. Live weight gain per area (GA) was calculated by multiplying ADG by animal-days (stocking rate × grazing days ÷ average tester weight). Animals received mineral salt containing essential macro- and micro-minerals ad libitum. Experimental procedures were approved by the Ethics Committee on Animal Use of EMBRAPA Cerrados under protocol 885-5498-1/2021.

2.4 | Forage Canopy Attributes

Forage mass (FM) was assessed by cutting at approximately 1 cm above ground within 2 × 0.5 m sampling sites (1 m^2). Twelve sampling sites were collected per experimental unit, distributed as four sites along each of three linear transects. For plant-part composition, six subsamples—each pooled from two FM samples per transect—were manually separated into leaf blade, stem (including leaf sheath), and dead material. Dead material was defined as senescent leaf blades and stems with at least 50% yellow or dry tissue. Dry matter (DM) was determined after drying samples in a forced-air oven at 55°C for 72 h. The leaf:stem (L:S) was calculated as the ratio of leaf blade to stem mass. Evaluations were conducted on January 18, February 15, March 14, April 24, May 30, and June 28 in the first year, and on January 16, February 22, March 26, April 29, May 22, and June 17 in the second year. Canopy height was measured every 2 weeks in a systematic zigzag pattern across 50 sites per experimental unit.

2.5 | Nutritive Value Attributes

For nutritive value analysis, forage was sampled using the hand-plucking method (Sollenberger and Cherney 1995). Samplings were conducted in all pastures on the same dates as those of the forage canopy. Samples (300–400 g fresh weight) were oven-dried at 55°C for 72 h and ground to 1 mm particle size using a Wiley mill. Crude protein (CP) (AOAC 1990); neutral and acid detergent fibre (NDF and ADF) (Van Soest et al. 1991); and in vitro dry matter digestibility (IVD) (Tilley and Terry 1963, modified by Moore and Mott 1974) concentrations were analysed by near-infrared spectroscopy (NIRS; FOSS). Validation statistics for *Urochloa* NIRS models (n, R^2, slope; and standard error of prediction, bias, and intercept in g/kg) were: CP (89, 0.94, 0.91, 8.9, −0.80, 12); NDF (90, 0.92, 0.91, 15.3, 2.2, 61); ADF (91, 0.95, 0.88, 13.4, −0.50, 39); and IVD (82, 0.82, 0.80, 17.7, −2.4, 126).

2.6 | Statistical Analysis

Data were analysed using the PROC MIXED (SAS Institute Inc 2020). Cultivar, sampling date, and their interaction (cultivar × sampling date) were considered fixed effects for ADG, SR, plant-part composition, and nutritive value, while block, year, and testers (for ADG) were treated as random effects. For GA, cultivar, year, and cultivar × year were fixed effects, and block was a random effect. Repeated measures analysis was conducted over time, with covariance structures selected based on Bayesian Information Criterion. Observations with studentized residuals exceeding ±3 were treated as outliers and excluded. Mean comparisons were applied using the t-test at $p < 0.10$, with results presented as least squares means (LSMEANS). Mean canopy height and its respective standard deviation for each pasture were plotted as line graphs throughout the experimental period.

3 | Results

Mean canopy height during the first year was 32 cm, ranging from 55 to 60 cm at the beginning of evaluations in January 2023, before stabilizing between 25 and 30 cm from February onwards (Figure 2A–C). In the second year, mean canopy height was slightly lower at 29 cm and remained closer to the

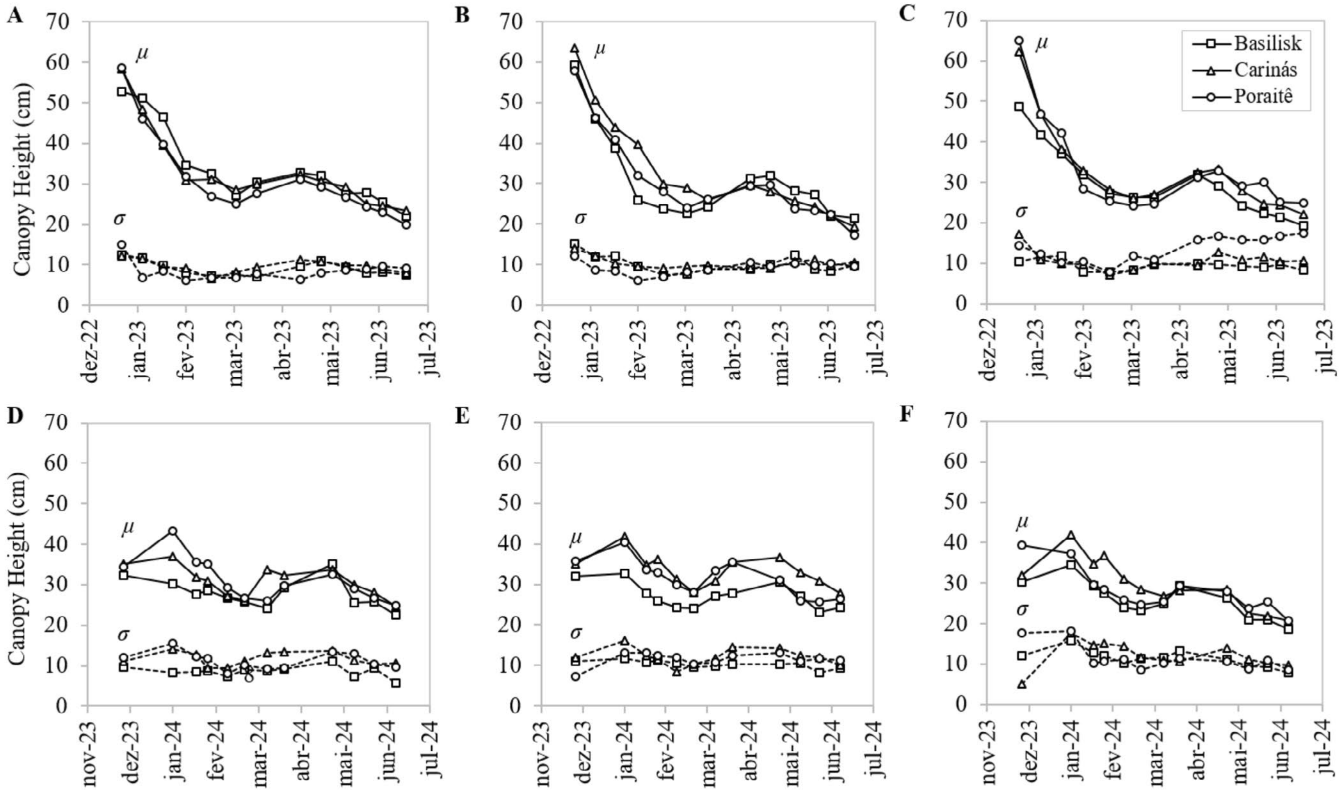

FIGURE 2 | Mean (μ) and standard deviation (σ) of canopy height for *Urochloa decumbens* cultivars Basilisk, BRS Carinás, and BRS Poraitê across 2 years of evaluation (January–June). Panels (A–C) correspond to year 1, while (D–F) correspond to year 2, representing blocks 1 (A, D), 2 (B, E), and 3 (C, F). Each point comprehends 50 measurements. Planaltina, FD, Brazil.

target throughout the evaluation period. Notably, Basilisk had a lower mean (27 cm) compared to Carinás (31 cm) and Poraitê (30 cm) (Figure 2D–F). Canopy height began to decline in April during the first year and in May during the second year, reaching approximately 20–25 cm by June, when evaluations concluded.

Leaf blade and stem were influenced only by the sampling date ($p < 0.10$), whereas dead material was affected by both sampling date and cultivar ($p < 0.10$). There was no significant cultivar × sampling date effect for plant-part composition ($p > 0.10$). On average, leaf blade and stem decreased by 65% and 52%, respectively, from January to June across both years ($p < 0.10$), with the most pronounced decline occurring from April onwards (Figure 3A,B). Conversely, dead material increased approximately two- to threefold as the proportions of leaf blade and stem declined in the FM ($p < 0.10$) (Figure 3C). Regardless of the sampling date, Basilisk had significantly greater amount of dead material (1314 ± 62.8 kg DM/ha) compared to Carinás and Poraitê (1127 ± 63.2 and 1150 ± 63.2 kg DM/ha, respectively) ($p < 0.10$). The L:S was affected by the interaction between cultivar and sampling date ($p < 0.10$). In January 2023, Carinás had greater L:S than Basilisk and Poraitê, while in May 2023, Basilisk had greater L:S than the other cultivars (Figure 3D). During the second year, specifically in February and March 2024, Basilisk again showed greater L:S (0.56 and 0.76, respectively) compared to Carinás (0.40 and 0.61) and Poraitê (0.49 and 0.65). Forage mass, calculated as the sum of leaf blade, stem, and dead material, ranged from 3450 to 3820 kg/ha in the first year and from 2250 to 3100 kg/ha in the second year.

All nutritive value variables—CP, IVD, NDF, and ADF—were influenced exclusively by the sampling date ($p < 0.10$). There was no significant cultivar × sampling date effect for any nutritive value variable ($p > 0.10$). Crude protein concentration declined sharply from February in both years, ranging from 110 to 170 g/kg between January and April, and dropping to 50–65 g/kg by June (Figure 4A). Although cultivar effect was not statistically significant ($p > 0.10$), Carinás and Poraitê showed a slight advantage in mean CP concentration (114 ± 7.4 g/kg) compared to Basilisk (105 ± 7.4 g/kg). In vitro digestibility concentration remained relatively stable throughout the experimental period, fluctuating between 625 and 700 g/kg, except for a peak in March of the second year (775 g/kg), followed by a marked decline (Figure 4B). Neutral detergent fibre concentration reached its lowest values in February for both years (mean 540 g/kg) and increased steadily thereafter, mainly for Basilisk and Poraitê (Figure 4C). Acid detergent fibre concentration was similar to NDF but less variable overall, except for more elevated values recorded in June 2024, mainly for Basilisk and Poraitê, which differed significantly from the overall mean of 300 g/kg (Figure 4D).

There was a significant cultivar × sampling date effect on SR ($p < 0.10$). During the first year, SR declined steadily from January to April 2023 ($p < 0.10$), whereas in the second year, the trend reversed, with SR increasing until April 2024 before decreasing thereafter ($p < 0.10$) (Figure 5). No significant differences in SR among cultivars were observed during the first year ($p > 0.10$). However, in February and March 2024, Poraitê and Carinás had greater SRs (2.8 ± 0.08 and 2.6 ± 0.10 AU/ha

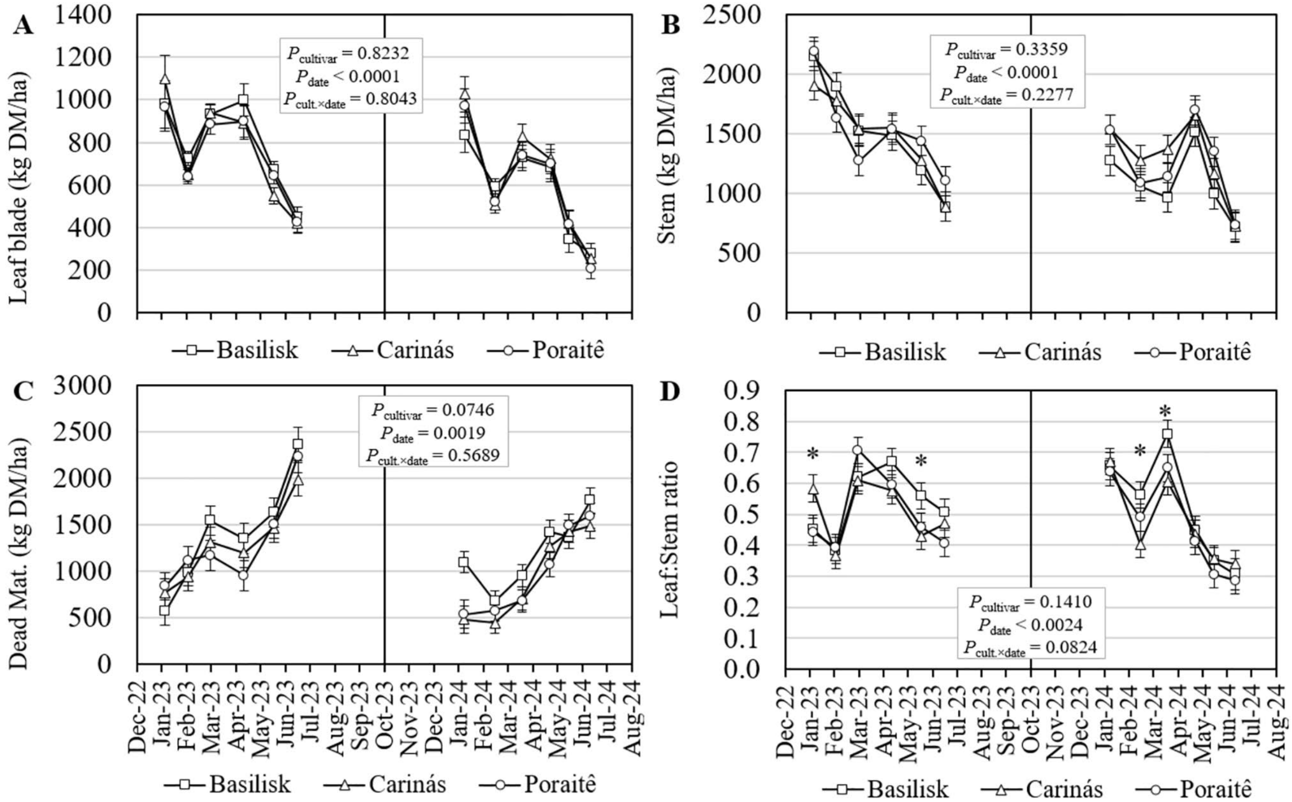

FIGURE 3 | Plant-part composition of forage mass for *Urochloa decumbens* cultivars Basilisk, BRS Carinás, and BRS Poraitê from January to June 2023 and 2024. (A) Leaf blade; (B) Stem; (C) Dead material; (D) Leaf:Stem ratio. *Significant at $p < 0.10$. Vertical bars represent the standard error of the mean. Planaltina, FD, Brazil.

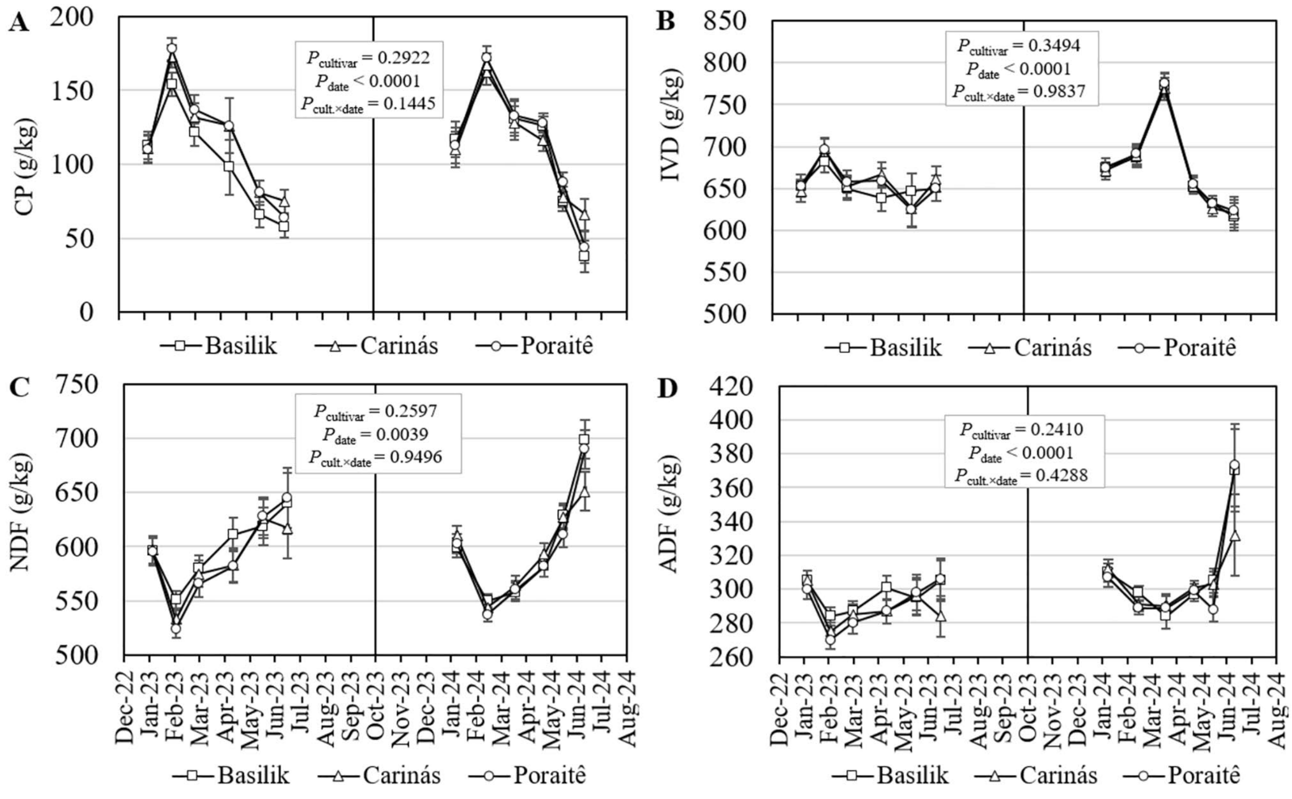

FIGURE 4 | Nutritive value of *Urochloa decumbens* cultivars (Basilisk, BRS Carinás, and BRS Poraitê) from January to June in 2023 and 2024. (A) Crude protein (CP); (B) In vitro dry matter digestibility (IVD); (C) Neutral detergent fibre (NDF); (D) Acid detergent fibre (ADF). Error bars represent ± standard error of the mean. Planaltina, FD, Brazil.

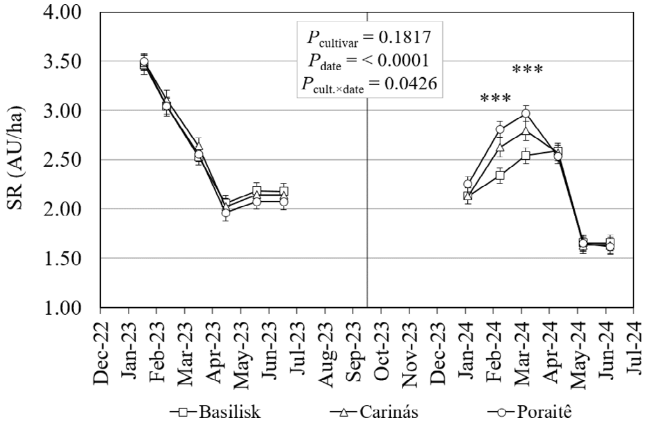

FIGURE 5 | Stocking rate (SR) in pastures of *Urochloa decumbens* cultivars Basilisk, BRS Carinás, and BRS Poraitê from January to June in 2023 and 2024. Statistical significance indicated by (***$p<0.001$). Vertical bars represent ± standard error of the mean. Planaltina, DF, Brazil.

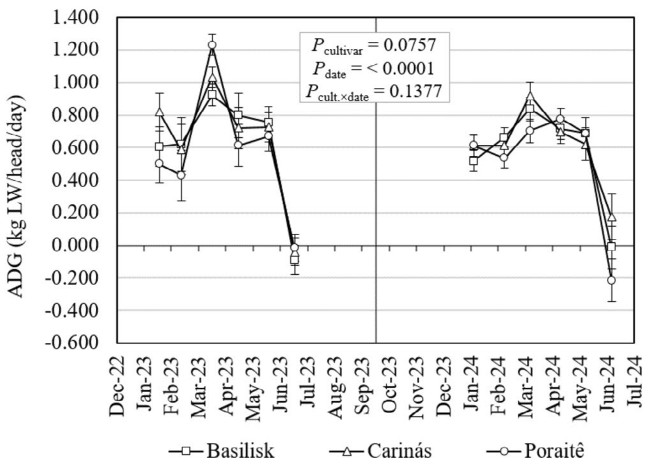

FIGURE 6 | Average individual daily live weight gain (ADG) of Nellore cattle grazing on pastures of *Urochloa decumbens* cultivars Basilisk, BRS Carinás, and BRS Poraitê from January to June 2023 and 2024. Vertical bars represent ± standard error of the mean. Planaltina, DF, Brazil.

in February; 3.0 ± 0.08 and 2.8 ± 0.10 AU/ha in March, respectively) compared to Basilisk (2.3 ± 0.08 and 2.5 ± 0.08 AU/ha, respectively) ($p<0.10$).

Both sampling date ($p<0.10$) and cultivar ($p<0.10$) significantly influenced ADG, in contrast to the cultivar × sampling date ($p>0.10$). The greatest mean ADG was observed in March (0.94 kg), while the lowest—near zero—occurred in June (−0.03 kg) during both years (Figure 6). From January to April, ADG remained relatively stable, with a mean of 0.71 kg. Across the entire experimental period, Carinás showed a greater mean ADG (0.62 ± 0.034 kg) compared to Poraitê (0.54 ± 0.03 kg) ($p<0.10$), while Basilisk showed an intermediate value (0.59 ± 0.034 kg) and statistically comparable to both ($p>0.10$).

The GA was influenced only by the cultivar effect ($p<0.10$). Carinás had greater GA compared to Basilisk and Poraitê across

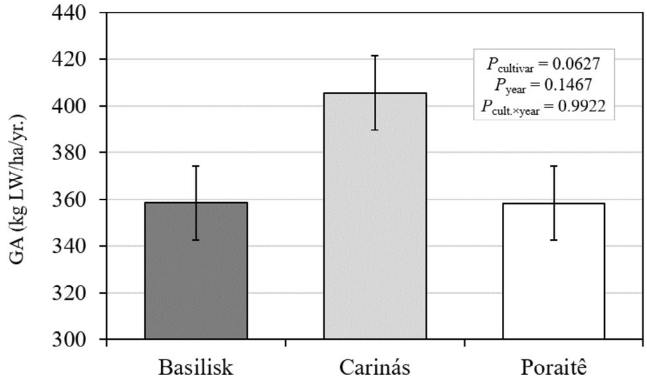

FIGURE 7 | Annual live weight gain per area (GA) of Nellore cattle grazing on pastures of *Urochloa decumbens* cultivars Basilisk, BRS Carinás, and BRS Poraitê, evaluated from January to June in 2023 and 2024. Vertical bars represent the standard error of the mean. Planaltina, FD, Brazil.

both years ($p<0.10$) (Figure 7). No significant differences were found between the 2 years, and for cultivar × year ($p>0.10$), with mean GA of 362 ± 12.0 kg LW/ha/year in the first year and 386 ± 17.1 kg LW/ha/year in the second year.

4 | Discussion

The ADG observed in the rainy season in the present study (0.71 kg; January–April) surpassed previous reports for Basilisk (0.53–0.60 kg) and, notably, for Kikuyu grass (*Urochloa humidicola* (Rendle) Morrone & Zuloaga) (0.220 kg) (Lima et al. 2019; Martins et al. 2013; Euclides et al. 2000, 2001). This performance, which includes novel results for Poraitê and Carinás cultivars, was more similar to those obtained from *U. brizantha* pastures managed under continuous stocking in Central Brazil (0.67–0.90 kg) (Paula et al. 2012; Euclides et al. 2016; Ruggieri et al. 2020). Possibly, the control of canopy height contributed to the ADG exceeding the mean values reported in the literature, such as the 0.60 kg observed in a meta-analysis for non-supplemented beef cattle grazing primarily *U. brizantha* and *U. decumbens* (Tambara et al. 2021).

The greater CP and lower fibre concentration of Carinás, particularly in June, may help explain its smaller decline in ADG during this period. This fact likely contributed to the overall superior performance of Carinás compared to Poraitê, considering the well-known influence of CP on ADG (Almeida et al. 2022). Although Carinás and Poraitê had similar leaf blade and stem to Basilisk, they temporarily showed a lower L:S ratio. However, this did not translate into an ADG advantage for Basilisk, despite the well-known correlation between L:S and ADG ($r>0.7$) (Euclides et al. 2007; Maciel et al. 2018; Braga et al. 2024). The maintenance of a specific canopy height likely constrained the expression of strong correlation between plant-part composition and animal performance within the season. For some reproductive traits, however, Poraitê has greater mean values compared to Carinás—basal raceme length of 10.3 cm (vs. 9.6 cm in Carinás), a peduncle length of 0.99 cm (vs. 0.81 cm). These larger reproductive structures of Poraitê, combined with the similarity of Carinás to Basilisk in this aspect, potentially contributed to the lower ADG observed for Poraitê, possibly due to the partial flowering noted during the rainy season (personal observation).

The dry season onset in June, marked by rainfall absence, limited the ADG due to declining canopy height (< 25 cm), increased dead material, and CP concentration (50–65 g/kg), consistent with observations for other forages in the same site (Braga et al. 2019, 2024). The CP concentration decline followed the leaf blade decrease and dead material increase, as previously reported for Basilisk (Braga, Ramos, et al. 2020). In Campo Grande, MS, Euclides et al. (2000) observed ADG of 0.26 and 0.17 kg for Basilisk and Marandu pastures under 3000 kg DM/ha and 1.5 AU/ha. In another study at the same site, near-zero gains (−0.03 kg) occurred for Basilisk under 2200 kg DM/ha and 0.9 AU/ha. In Piatã and Paiaguás pastures grazed at 30 cm mean canopy height, dry season ADG was 0.21 and 0.35 kg, respectively, at 1.3 AU/ha (Euclides et al. 2016). In the current study, maintaining at least three testers per pasture precipitated a decline in performance due to a pronounced reduction in canopy height, which shortened the evaluation period within the dry season. Moreover, severe droughts in Planaltina likely exacerbated these effects, reflected in CP concentration (< 65 g/kg) and leaf blade proportions (~10%) in June, which impacted ADG (Almeida et al. 2022; Braga et al. 2024). Although *Urochloa* species can partially support ADG during the dry season through stockpiling (Amorim et al. 2019; Silva et al. 2019) or the use of adapted cultivars (e.g., Paiaguás) (Euclides et al. 2016), forage seasonality necessitates supplementary strategies. These include the use of mixed grass-legume pastures (Paciullo et al. 2003; Aroeira et al. 2005; Braga et al. 2019), conserved forage and concentrate supplementation (Euclides et al. 2001; Garcia et al. 2004, 2014).

Leaf blade decreased from rainy to the dry season due to an increase in dead material but showed stability during the rainy season (except February) with similar declining trends across years. Notably, the 25% leaf blade proportion observed in the current study was greater than the 19% reported by Euclides et al. (2000), but lower than the 30% observed by Braga, Pedreira, et al. (2020). Meanwhile, the L:S (0.4–0.8) during the rainy season was lower than typical values for *U. brizantha* cultivars (0.9–1.5) (Euclides et al. 2016; Paula et al. 2012; Ruggieri et al. 2020). These difference likely accounts for the greater ADG observed with *U. brizantha* in the existing literature. The nutritive value was comparable to those reported for fertilized Basilisk pastures grazed at 25 cm canopy height (Braga, Ramos, et al. 2020), maintaining satisfactory values across rainy season in both years (CP > 110 g/kg, IVD > 650 g/kg, NDF < 600 g/kg, ADF < 310 g/kg). Considering fibre passage rate and low-digestibility fibre fractions, forage intake decreases when NDF and ADF concentration approach 550–600 and 350–400 g/kg DM, respectively (Van Soest 1994; Mertens 1994), a threshold reached only during the early dry season (May–June) in the present study. The results demonstrate that grazing management aimed at optimizing consumption of high-quality plant parts (e.g., leaf blade) prevents fibre concentration from exceeding levels that impair animal performance, a typical challenge with C4 tropical grasses (Reis and da Silva 2006; Euclides et al. 2010; Da Silva et al. 2013).

The elevated CP concentration (~170 g/kg) observed in February following nitrogen fertilization likely contributed to the subsequent ADG increase in March, especially in the first year, highlighting the strong positive correlation between these variables (Almeida et al. 2022). Besides fertilization, plant ontogeny induces plant-part and nutritional changes that influence animal performance fluctuations despite maintaining canopy height (Pedreira et al. 2017). Early flowering of *U. decumbens* (December/January), which increases stem proportion in forage mass, can be moderated by canopy height management but not entirely prevented (Braga, Pedreira, et al. 2020), as observed in the current study for all cultivars. Later-flowering species and cultivars, such as Guinea grass (*Megathyrsus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs) and *U. brizantha* cv. Xaraés, remain vegetative during the rainy season and generally present greater productivity (Euclides et al. 2010). However, they are less suitable for dry season use due to a more pronounced late flowering, in contrast to *U. decumbens*.

The SR was adjusted in the beginning of the study to ensure the canopy height target was reached by February 2023. In the second year, with canopy height near the target, SR remained more stable during the rainy season (January–April). The positive effect of nitrogen fertilization on SR was apparent in the second year, requiring additional grazers, especially in Carinás and Poraitê pastures, to maintain canopy height targets and balance forage growth and intake (Delevatti et al. 2019). The greater SR required by the Carinás and Poraitê cultivars during this period reflects their superior productive potential compared to Basilisk. The increased growth of Carinás and Poraitê, followed by a rise in SR might lead to the transient reduction in the L:S. Stocking rate declined sharply from April in the first year (2.1 AU/ha) and from May in the second year (1.6 AU/ha), reflecting below-average rainfall in early 2023 (Figure 1). The decline in SR across cultivars during the rainy-to-dry season transition demonstrates the productivity drop typical of *U. decumbens* and other tropical forages at this time of the year (Fagundes et al. 2005).

Because of greater ADG throughout the experiment and the occasional greater SR, Carinás outperformed Basilisk and Poraitê in terms of GA. Previous studies in the Cerrado biome stated nitrogen fertilization and intercropping with legumes mediate the carrying capacity and GA of cattle grazing on *Urochloa* spp. pastures. For example, Marandu pastures fertilized with 50 kg N/ha/year showed GA ranging from 240 to 340 kg LW/ha/year (Paula et al. 2012); Piatã and Paiaguás pastures with 90 kg N/ha/year achieved 590 and 740 kg LW/ha/year, respectively (Euclides et al. 2016); Basilisk intercropped with *Stylosanthes guianensis* yielded 460 kg LW/ha/year (Almeida et al. 2002); Basilisk and Marandu grazed without fertilization achieved 380 kg LW/ha/year, increasing to 430 kg LW/ha/year when intercropped with *Calopogonium mucunoides* (Euclides et al. 1998); and Kikuyu grass cv. Tupi and cv. Comum fertilized with 50 kg N/ha/year showed GA of 130 to 190 kg LW/ha/year, respectively (Martins et al. 2013). Under intensive nitrogen fertilization (270 kg N/ha/year), Marandu pastures achieved up to 970 kg LW/ha/year (Delevatti et al. 2019). The mean GA observed in this study (370 kg LW/ha/year) is, therefore, similar to those reported for *U. decumbens* and *U. brizantha* species, and exceeds values observed for Kikuyu grass cultivars under typical fertilization of 50 kg N/

ha/year. This aligns with the regional beef cattle operations, where nitrogen fertilization is occasionally applied to *Urochloa* spp. pastures. As observed, the advantage of Carinás over Basilisk (approximately 13%) aligns its productive performance with that of high-yielding *U. brizantha* cultivars, such as Marandu, Piatã, and Paiaguás.

Controlling canopy height through variable SR likely contributes to the relative stability of ADG in the current study, except for the sharp increase in March following nitrogen fertilization and the severe decline in June. In contrast, fixed SR can lead to significant short-term fluctuations in ADG due to forage allowance depletion, as reported by Garay et al. (2004) and Braga et al. (2024). However, maintaining grazing targets presents operational challenges, as it depends on plant growth variations in response to fertilization, water deficit, and low temperatures. Furthermore, the ability to accurately assess pasture conditions and adjust SR—considering pasture size and animal age—affects the consistency of canopy height control, explaining the fluctuations documented here and previously by Flores et al. (2008) and Casagrande et al. (2011).

The results confirm the edaphoclimatic adaptation of the new *U. decumbens* cultivars to the Cerrado biome, highlighting their ability to promote weight gain in beef cattle due to their nutritional value and plant-part composition similarity to the Basilisk cultivar, particularly when canopy height is maintained relatively steady. Moreover, managing pasture by canopy height becomes increasingly important with the more frequent and intensive use of nitrogen fertilization, especially for more productive and taller cultivars like Carinás and Poraitê. However, recommendations for their use should consider their low resistance to spittlebugs; therefore, their establishment should be discouraged in areas with a history of frequent infestations. Overall, the results demonstrate the greater productivity of Carinás and Poraitê compared to Basilisk, mainly due to their greater carrying capacity (i.e., SR). When combining SR with ADG, Carinás yielded approximately 13% greater animal productivity in terms of GA than the other cultivars. Nevertheless, further research involving different management objectives and animal category is required to fully confirm the advantages of these new cultivars over Basilisk. This is particularly relevant regarding their nutritional value, which is key for enhancing weight gain in beef cattle.

Acknowledgements

We acknowledge UNIPASTO (Association for the Promotion of Forage Breeding Research) for partial funding and Agropecuária Julio Bernardes for supplying the Nellore cattle for this study. The Article Processing Charge for the publication of this research was funded by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) (ROR identifier: 00x0ma614).

Funding

This work was supported by Associação para o Fomento à Pesquisa de Melhoramento de Forrageiras.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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