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Establishment and early growth of *Brachiaria* grass cultivars in Coastal Lowlands of Kenya

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Key words: *Brachiaria cultivars*, Dry matter yield, Plant number, Tiller number, Plant height, Ground cover

Abstract

A study was conducted to evaluate the establishment and early growth of *Brachiaria* cultivars; *Brachiaria decumbens* cv. Basilisk, *Brachiaria. brizantha* cvs. Marandu, Piata, Xaraes and MG-4, *Brachiaria hybrid* cv. Mulato II and *Brachiaria humidicola* cv. Llanero and Rhodes grass (*Chloris gayana* cv. Ex-Tozi) as control. The experiment was conducted between November 2013 and April 2014 at Kenya Agricultural and Livestock Research Organization, Mtwapa and Msabaha Centres in Coastal Kenya. The treatments were set out in a randomized complete block design with four replications. Data was taken on plant number, tiller number, plant height and ground cover at 4, 8, 12 and 16 weeks after seedlings emergence. Dry matter yield was assessed at 16 weeks. Results indicated that Basilisk, Llanero and MG-4 had the highest plant number at Mtwapa while Piata and Basilisk were highest at Msabaha. Piata had highest plant height at Mtwapa while Mulato II was highest at Msabaha respectively. The cultivars were significantly ($p \leq 0.05$) different on tiller number in both sites. Mulato II recorded the highest tiller number, followed by MG-4 and Basilisk respectively. Llanero had higher ground cover followed by Mulato II and MG-4 at Mtwapa but Xaraes was highest at Msabaha. Marandu (7.8t ha^{-1}) and Xaraes (8.7t ha^{-1}) had the highest dry matter yield at Mtwapa. MG-4 (3.5t ha^{-1}) and Basilisk (3.1t ha^{-1}) highest dry matter yield at Msabaha. Finally, Basilisk, Llanero, MG-4 and Piata emerged fast while Marandu, Xaraes, MG-4 and Basilisk recorded high dry matter yields than Rhodes grass.

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Introduction

Forage plays an important role in agricultural economy of developing Countries by providing the cheapest source of feed for the livestock. In coastal lowland of Kenya, one of the most important challenges to livestock production is scarcity of feeds during the dry period. The feed resources available in the smallholder mixed farms are inadequate in quantity and low in quality. Lack of adaptive cultivars, frequent and prolonged drought and low rainfall distribution are major factors leading to inadequate quality and quantity of feeds.

Farmers primarily depend on natural pasture for feed to their livestock and more often give low priority to pasture establishment. Past attempts to improve dairy production focused mainly on promotion of Napier grass on-farm (Mureithi *et al.,* 1998) and other grasses and legumes (Njunie and Ogora, 1990). Despite these efforts, cultivated forages accounts for less than 15% of dairy feed in all the month within a year (Njarui *et al.*, 2016).

In addition, land sub-division has also contributed to feed shortage through limited available land for pasture establishment (Jones *et al.*, 2004). Subsequently, finding alternative feeds for livestock is an important step to sustain livestock production in the Coastal lowlands of Kenya. The shortage can be solved through finding a climate friendly way through the evaluation on establishment and growth of improved *Brachiaria* grass cultivars.

Brachiaria grasses have tendency to adapt to drought, resilient in soils with low fertility and produce well with low levels of fertilizers. They are also resistant to many pests and diseases affecting the forages in the Country (Miles *et al.*, 2004). *Brachiaria* grass plays vital roles to control soil erosion and ecological restoration. According to (Mile *et al.*, 2004), *Brachiaria* grass sequesters carbon through its large root system and enhances nitrogen use efficiency and subsequently, minimises eutrophication and greenhouses gases.

These cultivars have been vital constituent of sown pastures in humid low lands and savannas of Tropical America (Brazil) with present estimated acreage of 99 million hectare (Jank *et al.*, 2014).The grass has a potential of production of high tiller number hence high dry matter yield (Miles *et al.*, 2004). Further, *Brachiaria* species produce abundant roots which contribute to the collection of water, soil aggregation and aeration. Therefore successful establishment determines productivity and long term persistence of the grass.

In Kenya, *Brachiaria* grows well in areas where annual rainfall is above 700mm and mean temperatures exceeding 19^{o}C. (Njarui *et al.*, 2015) reported that the species requires well drained deep soils. There have been previous efforts to improve the productivity of these grasses (Ndikumana and de Leeuw. 1996), however there is scant information on the establishment and growth of these grasses in the Coastal lowlands. The objective of this study was to evaluate the establishment and early growth of *Brachiaria* grass cultivars in the Coastal lowlands of Kenya.

Materials and methods

The study was conducted at Mtwapa and Msabaha KALRO centres which are located in Coastal Lowlands (CL) agro ecological zones (Fig.1) (Jaetzold *et al.*, 2006). Mtwapa site is located in CL 3 also known as the coconut-cassava zone. Latitude 3^{o}36'S, longitude 39^{o}44'E and 15 m above sea level. The site experience bimodal rainfall, the long rains (LR) occurring from April to July and the short rains (SR) from October to December, totalling to 1200 mm annually. The mean annual temperature ranges from a minimum of 24-27^{o}C in May-July to a maximum of 30-32^{o}C in January to April. The soils are well drained, deep, low in available nutrients, and have low to moderate water holding capacity. The top soil texture is sandy loam to sandy clay loam with low organic matter content (Jaetzold *et al.*, 2006).

The KALRO Msabaha site falls in the CL4 or Coconut-Cashewnuts zone. Located at latitude 3^{o}16'S, Longitude 40^{o}03'E and an altitude of approximately 45 m a.s.l (Jaetzold *et al.*, 2006). The rainfall pattern is similar to Mtwapa but the mean annual rainfall is lower (1000mm). The mean annual temperature ranges from a minimum of 24-27^{o}C in May-July to a maximum of 30-32^{o}C in January to April. The soils are orthic luvisols with solodic planosols, sandy and well drained (Jaetzold *et al.*, 2006).

Kalro-Mtwapa Mandate County

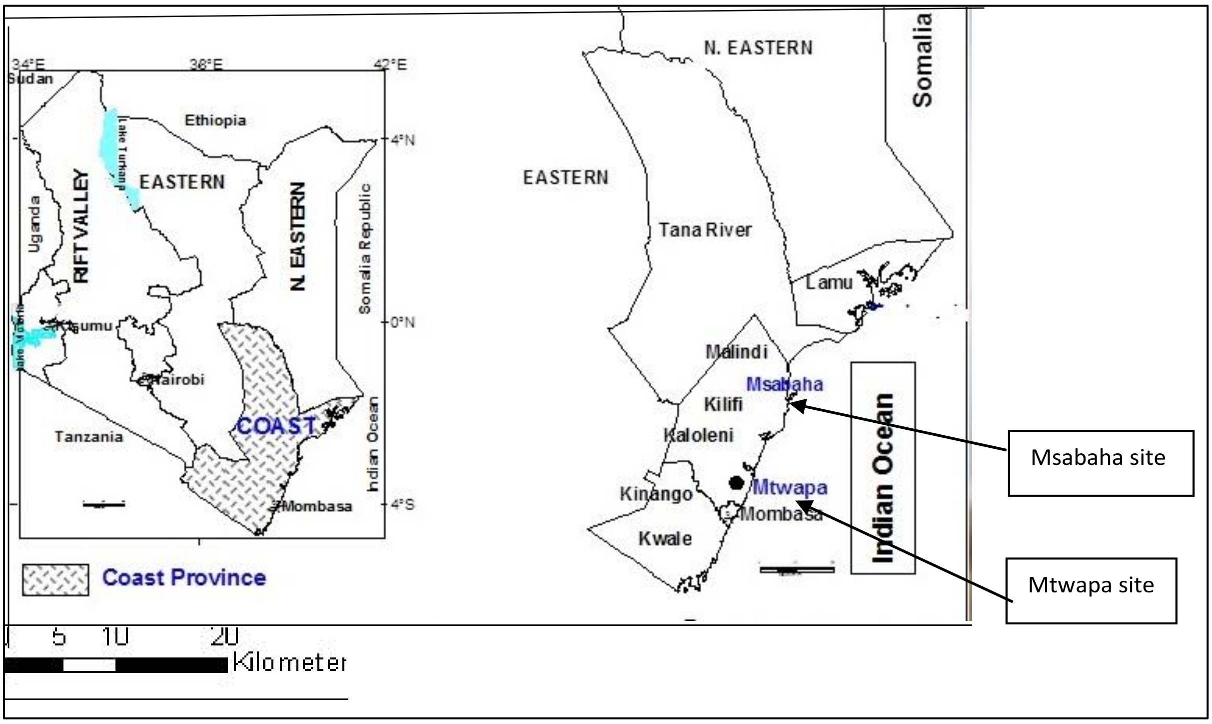

Fig. 1. Map showing study sites in Coastal Lowlands, Kenya: Mtwapa and Msabaha. *Source: Internet, 2018.*

The rainfall pattern during the study is shown in (Fig. 2 and 3) below. The amount of rainfall received in Mtwapa during the establishment phase November, 2013 to April, 2014 was 370 mm with a mean temperature of 28^{o}C. The hottest months at Mtwapa (Fig. 2) were in March and April, (28.3^{o}C and 28^{o}C) respectively. At Msabaha site, amount of rainfall recorded during the establishment phase was 194 mm. The hottest months at Msabaha site were March and April, 2014 with temperatures ranging from 29.1^{o}C-29.4^{o}C (Fig.3). However, high temperature fluctuation was observed in Msabaha while less variation was observed in Mtwapa. Generally, Mtwapa received rainfall almost twice the amount recorded at Msabaha during the experimental period.

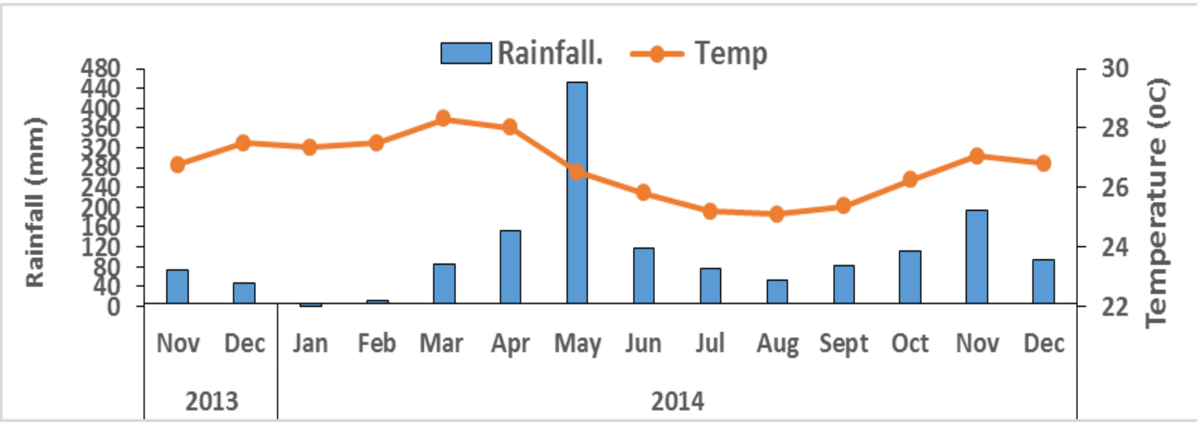

Fig. 2. Monthly rainfall and mean temperature at Mtwapa from November, 2013 to December, 2014. *(Source: Meteorological station, KALRO, Mtwapa)*

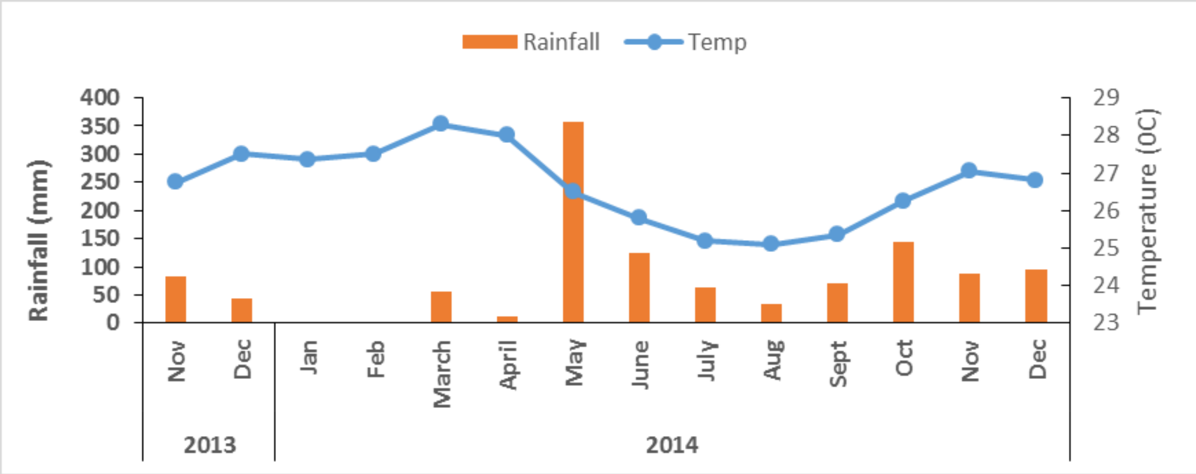

Fig. 3. Monthly rainfall distribution and mean temperature at Msabaha from November, 2013 to December, 2014. *(Source: Meteorological station, KALRO, Msabaha).*

The physico- chemical characteristics of the soil was sampled at the depth of (0-20cm). The general soil texture for Mtwapa was sandy loam, while at Msabaha was sandy. The soil pH for Mtwapa and Msabaha were 6.7 and 5.3, respectively, which was classified as slightly acid and medium acid based on the critical levels as recommended by Okalebo *et al. (*2002). The organic carbon levels of soils at Mtwapa and Msabaha were 0.3% and 0.26%, respectively, implying that the soils at Mtwapa and Msabaha sites had moderate organic carbon. The nitrogen content in the soil was 0.03% in both sites, which can be regarded as moderate.

Land preparation, planting and experimental design

A total of 963.5 m^2 was prepared for each site. The land was ploughed and disc harrowed in October-November, 2013. The land was divided into four blocks each comprising eight plots of (4 x 5m). This was followed by making furrows 5cm deep. Triple super phosphate (TSP, 46% P_2O_5) fertilizer was applied in the furrows at the rate of 40kg P ha^{-1} then slightly mixed with a thin lay of soil. The seeds of *Brachiaria brizantha* cvs. Marandu, Xaraes, BRS Piata and MG4, *B. decumbens* cv. Basilisk, *B. hybrid* cv. Mulato II, *B. humidicola* cv. Llanero were imported from Genetic Resource Program of International Center for Tropical Agriculture (CIAT) while rhodes grass as a check was sourced at KALRO-Mariakani. These seeds were then drilled by hand in the furrows of about 2cm deep at the seed rate of 5kg ha^{-1} with inter-rows spacing of 0.5 m and covered with a thin layer of soil. The plots were kept weed free during the experimental period by hand weeding and slashing between the plots to reduce weed competition within the replications. Standardization cuts were carried out in the sixteenth week of the onset of the long rains and thereafter nitrogen as ammonium nitrate fertilizer was applied at the rate of 100kg N ha^{-1}.

Data Collection

Plant parameters, including plant number, plant height, tiller number and ground cover at 4, 8, 12 and 16 weeks after seedling emergency were recorded in both sites. Plant number was determined by counting plants within 1m x 1 m fixed quadrat frame placed randomly over two rows within the plots. Plant heights were measured using a meter rule placed from the ground base of the plant to the flag leaf to get the measurement (cm) as described by Rayburn *et al.* (2007). Tiller numbers of the four tagged plants were counted and total tiller numbers m^{-2} on each measurement occasion was defined as the sum of the total tiller number.

The Ground cover was determined from a 1m x 1m quadrant sub-divided into 25 squares of 0.2m x 0.2m as described by Njarui and Wandera, (2004). Ground cover in each of the squares was determined as the number of squares fully covered with grass to calculate percentage coverage.

However, if the ground were not fully covered, they were aggregated together with others in order to proportion cover and derived the percentage as follows:

$$\% \text{ ground cover} = \frac{\text{No. of squares fully covered}}{25} \times 100$$

To determine dry matter yield, the forage biomass was harvested from 1 m^2 quadrant by hand using a sickle leaving a stubble height of 5cm from the ground base. The biomasses were immediately weighed after each harvest using a portable electronic weighing balance. Thereafter, a representative sub-samples were taken from each plot at each site, weighed and oven dried at 65°C to a constant weight. The oven-dry weight was used to calculate dry matter yield per plot which was then extrapolated to (DM) yields inkg ha^{-1}.

Data analysis

The values on growth parameters and DM yields were statistically evaluated separately for each site using Statistical Analysis system (SAS) package (SAS, 2001). Least significant difference (LSD) test was used for variables whose *F* values stated a significant difference (p≤0.05). The statistical model:

$$Y_{ijk} = \mu + R_i + C_j + M_k + \sum_{ijk}$$

Where; Yij= the measurement (observation response), μ= overall mean, R is the effect of ith replicate (i=1 to 4), Cj is the effect of jth *Brachiaria* cultivars (j=1 to 8), M is effect of Mkth monitoring interval, *εijk* is experimental error

Results

Plant numbers

At Mtwapa, the plant numbers increased slightly over 4 weeks and were highest at 12 weeks, and then remained fairly stable for all the *Brachiaria* cultivars (Fig. 4 a). The plant numbers were not significantly (p≤0.05) different in case of the *Brachiaria* cultivars. Basilisk recorded consistently the highest plant number (28 plants m^{-2}) during the establishment phase at 12 and 16 weeks, showing a slight increase at 4 weeks (23 plants m^{-2}) and 8 weeks (25 plants m^{-2}). For Rhodes grass, plant number declined slightly from (27 to 26 plants m^{-2}). Mulato II remained fairly constant, and ranged from (21 to 22 plants m^{-2}). Marandu increased steadily from (18 to 21 plants m^{-2}) at 4 to 16 weeks. Whereas Xaraes showed an increase at 8 and 12 weeks respectively. Generally, growth was high for Basilisk, Llanero and MG-4 and low for Marandu and Mulato II at 16 weeks.

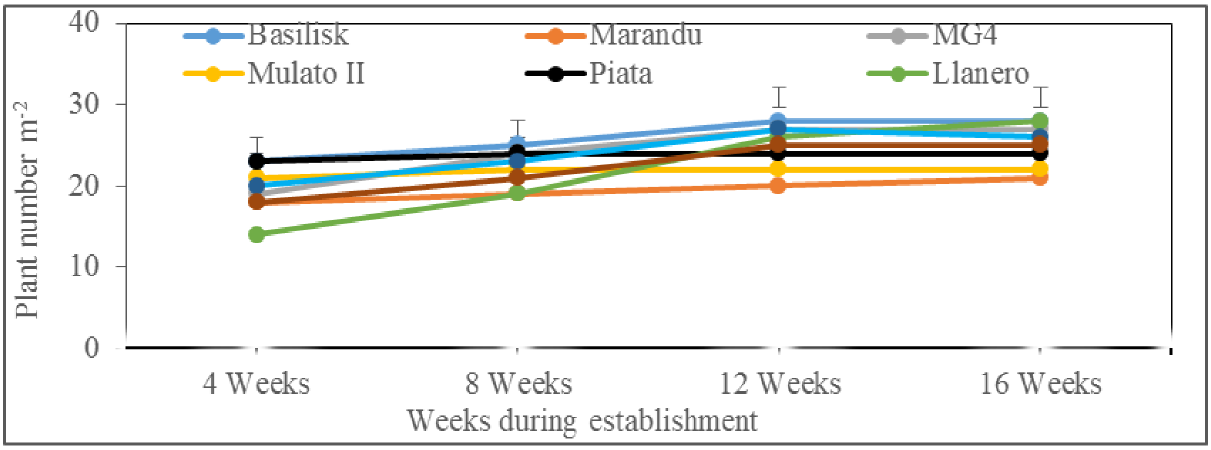

Fig. 4 a). Effect of cultivar on Plant population (number m^{-2}) during the establishment phase at Mtwapa site. Vertical bars represent LSD ($p \leq 0.05$).

At Msabaha, *Brachiaria* at 4 weeks after planting recorded (12-13 plants m^{-2}) for Piata and Basilisk among the *Brachiaria* cultivars (Fig. 4 b). While the poorest was Mulato II and Marandu at (8-10 plants m^{-2}). The number slightly increased at 12 weeks for Xaraes and Piata which attained mean of (12-13 plants m^{-2}) and above. In addition, Piata maintained the highest number but did not surpass (13 plants m^{-2}).

Mulato II had the lowest at 4 and 8 weeks while MG-4 had (9 plants m^{-2}) at 16 weeks. Generally, the plant numbers for Llanero and Piata remained relatively constant, and ranged from (10 and 13 plants m^{-2}).

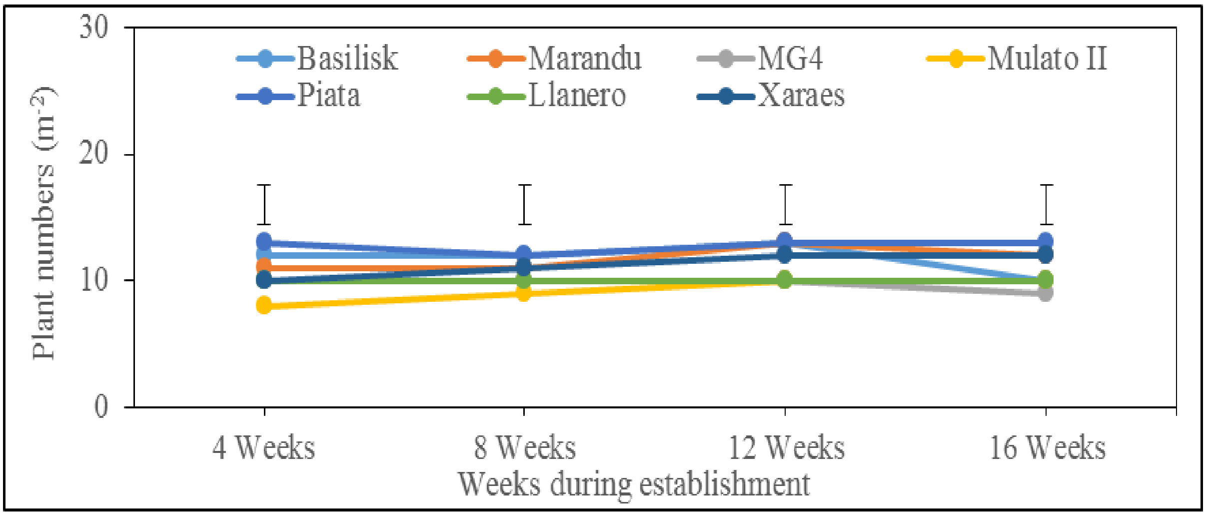

Fig. 4 b). Effect of cultivar on Plant population (number m^{-2}) during the establishment at Msabaha site. Vertical bars represent LSD ($p \leq 0.05$).

Plant height

There were significant ($p \leq 0.05$) differences in plant heights among the *Brachiaria* grass cultivars at 4 and 16 weeks at Mtwapa (Fig. 5 a). Piata was the tallest (61.3cm) while Llanero had the lowest height (43.5cm) at 16 weeks. Height of Piata (20cm), Mulato ll (18.3cm) and Marandu (15.0cm) was intermediate. However, Llanero (12.0cm) recorded the lowest plant height at 4 weeks as the shortest among the *Brachiaria* cultivars.

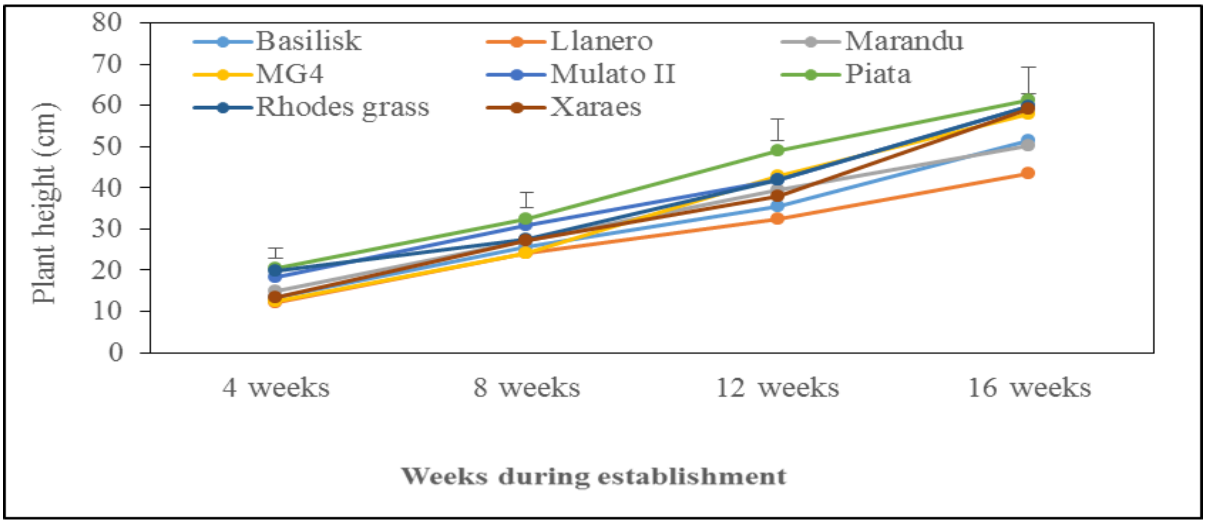

Fig. 5 a). Effect of cultivar on Plant height (cm) during the establishment phase at Mtwapa site. Vertical bars represent LSD ($p \leq 0.05$).

At Msabaha (Fig. 5 b), mean plant height at 4 weeks ranged from (7.0cm and 15.8cm). Marandu recorded the lowest height and Mulato ll the highest plant height respectively.

Piata recorded (12.8cm) and Llanero (13.0cm) at 4 weeks. Moreover, Llanero recorded 37.3 to 53.8cm at 12 and 16 weeks respectively.

Marandu and MG-4 attained the shortest height average of (37.5cm and 42.0cm) at 16 weeks respectively.

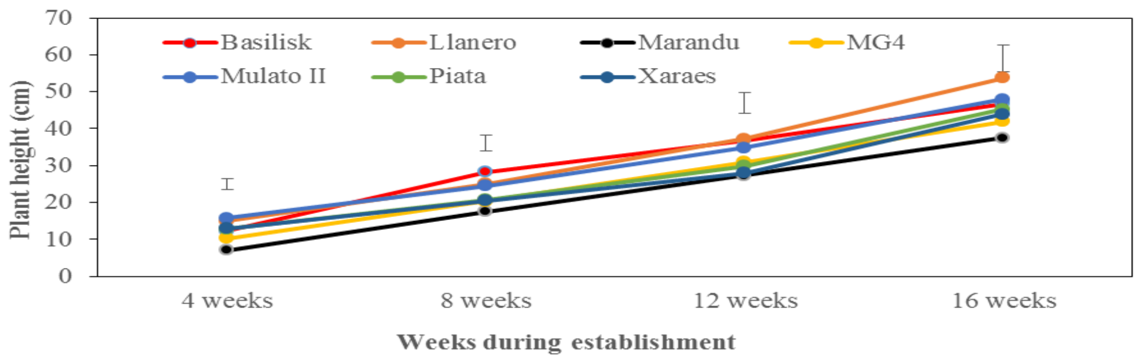

Fig. 5 b). Effect of cultivar on Plant height (cm) during the establishment at Msabaha site. Vertical bars represent LSD (p ≤ 0.05).

Plant tiller number

The results revealed significant (p≤0.05) difference for the *Brachiaria* grass cultivars on tiller numbers at Mtwapa. The plant tiller numbers increased progressively for all the cultivars as shown in the (Fig. 6 a). Mulato ll had the highest tiller numbers while Piata recorded the lowest at 4 weeks. MG-4 and Basilisk recorded similar tiller numbers (20 tillers plant^{-1}). At 8 weeks, the average tiller numbers ranged between (14 to 25 tillers plant^{-1}) whereas at 12 weeks, the tiller numbers ranged from (16 to 35 tillers plant^{-1}). At 16 weeks, Mulato ll and Llanero recorded highest tiller numbers each that however was not significantly (p≤0.05) different from Rhodes grass (28.3 tillers plant^{-1}).

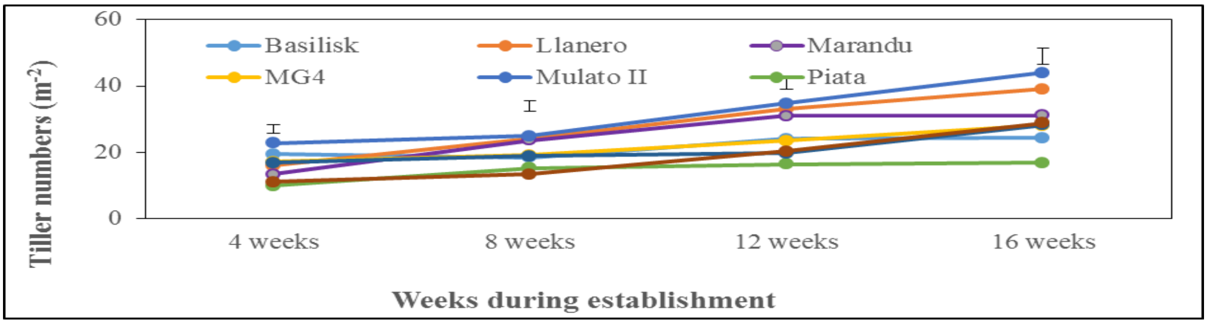

Fig. 6 a). Effect of cultivar on Tiller numbers plant^{-1} during the establishment phase at Mtwapa site. Vertical bars represent LSD (*p* ≤ 0.05).

At Msabaha (Fig. 6 b), the number increased from (6 to 16 tillers plant^{-1}) at 4 weeks and (18 to 54 tillers plant^{-1}) at 16 weeks. Piata recorded the lowest tiller numbers (10 tillers plant^{-1}) at 8 weeks, whereas MG-4 had the highest (23 tillers plant $^{-1}$). Basilisk recorded the highest tiller numbers at 4 weeks while Mulato ll had the highest at 12 and 16 weeks, respectively.

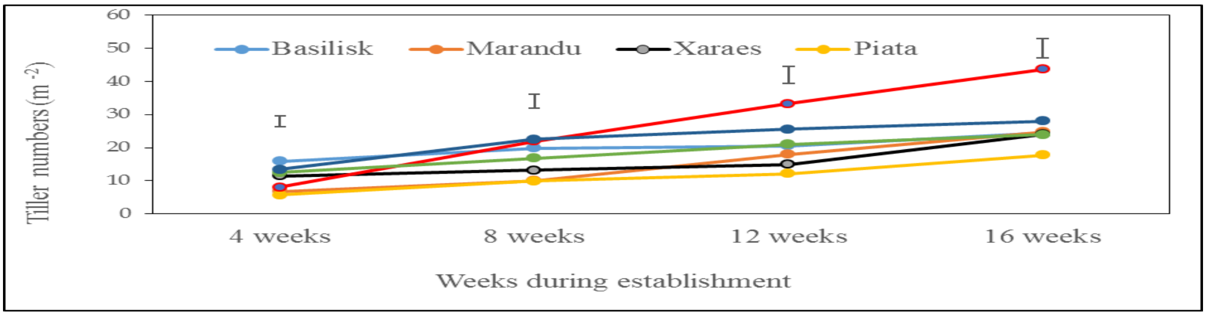

Fig. 7 b). Effect of Tiller numbers plant^{-1} cultivars during the establishment phase at Msabaha. Vertical bars represent LSD (*p* ≤ 0.05).

Ground cover

Ground cover for the grasses generally increased for all the cultivars and cover means were significantly (p≤0.05) different among the *Brachiaria* cultivars (Fig. 8 a). At Mtwapa, the ground cover ranged between (17 to 25%) at 4 weeks. Llanero recorded higher ground cover through (8 to 16) weeks (79 and 92%). Lanero had (96%) as the highest cover followed by Mulato II (92%) significantly higher than the control Rhodes grass (82%) at 16 weeks. Of the *Brachiaria* cultivars, MG-4 recorded (90%), Marandu and Xaraes (81%) each while Basilisk and Piata had (72%) as the lowest cover. Xaraes attained the highest ground cover (80%) followed by Basilisk (67%).

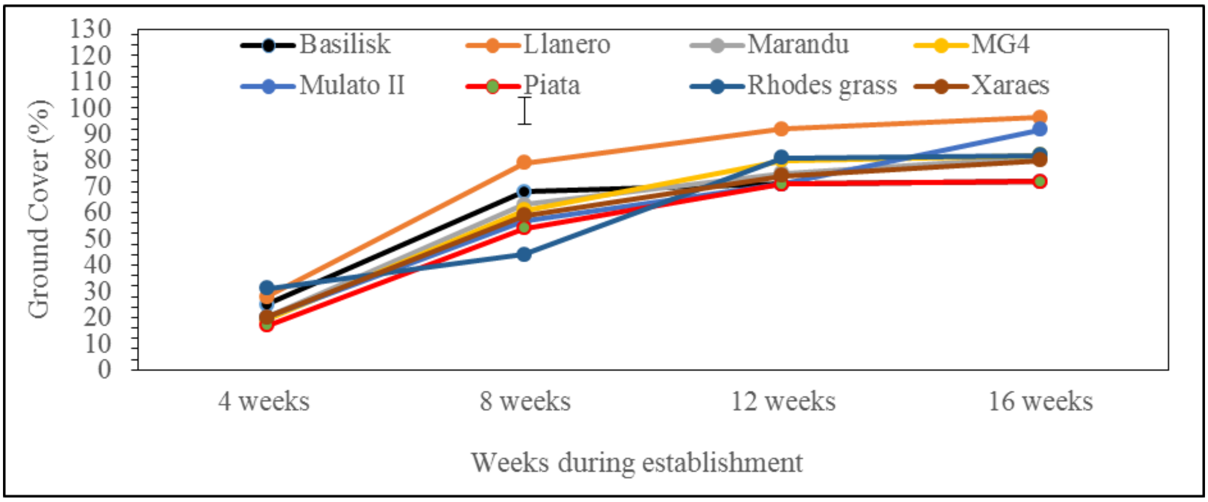

Fig. 8 a). Effect of cultivar on Percentage ground cover during the establishment phase at Mtwapa site. Vertical bars represent LSD ($p \leq 0.05$).

At Msabaha, ground cover at 4 weeks for *Brachiaria* cultivars was generally poor (Fig. 8 b). All cultivars showed slow growth recording ground cover of (17%) at 4 weeks, hence over 40% at 16 weeks. Xaraes attained the highest significant ground cover (80%) than most of the other *Brachiaria* cultivars at 16 weeks. However, only Llanero had less than 50% ground cover at the end of the establishment phase (Fig. 8 b).

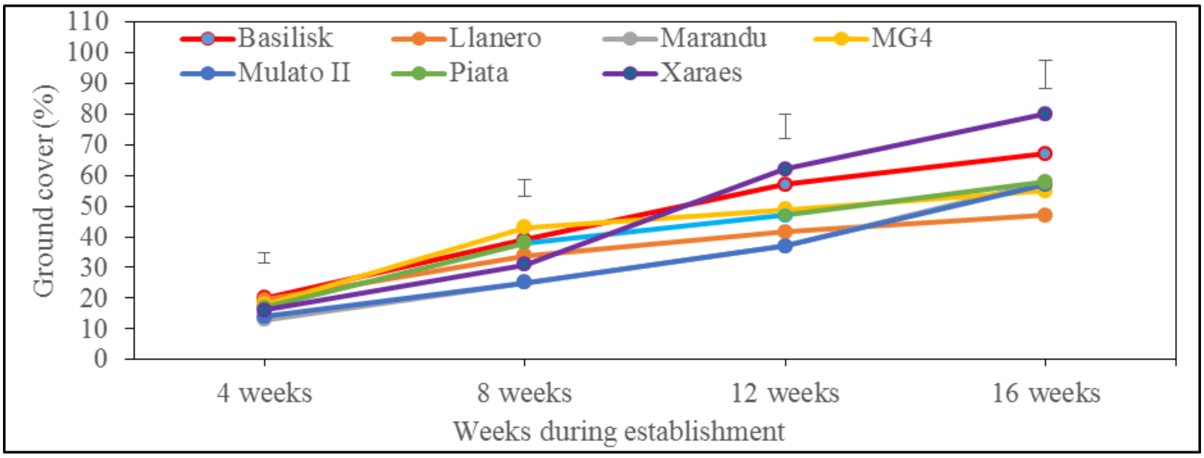

Fig. 8 b). Effect of cultivar on Percentage ground cover during the establishment phase at Msabaha site. Vertical bars represent (LSD ($p \leq 0.05$).

Dry matter yield

Fig. 9 a) shows the total dry matter yield of the cultivars at 16 weeks during the establishment phase at Mtwapa representing the primary production. There were significant (p≤0.05) differences in DM yield between the *Bachiaria* grass cultivars. Xaraes produced higher DM yield than the other cultivars averaging to (8.7t ha-1) but not significantly (p≤0.05) different from Basilisk, MG-4 and Mulato II. Piata had the lowest DM yield (5.0t ha-1) and was similar (p≥0.05) to Llanero.

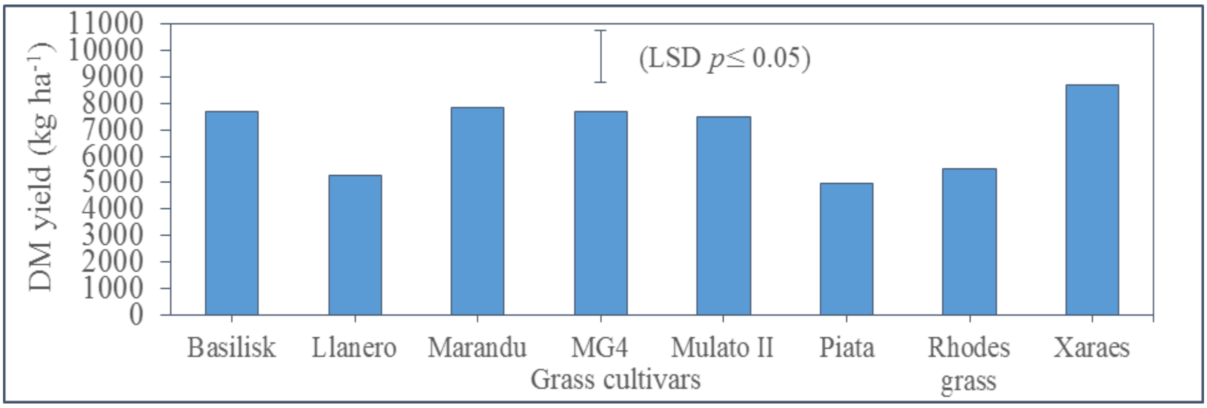

Fig. 9 a). Effect of cultivar on dry matter yield during the establishment phase at Mtwapa site. Vertical bar represent LSD ($p \leq 0.05$).

At Msabaha, MG-4 had the highest DM yield (3.5t ha-1) followed by Basilisk, but were not significantly (p≤0.05) different (Fig. 9 b). Piata recorded (2.4t ha-1), Mulato ll and Marandu had comparable yield while Xaraes and Llanero recorded (1.7t ha-1) respectively having similar yield. Llanero had the lowest DM yield at 16 weeks.

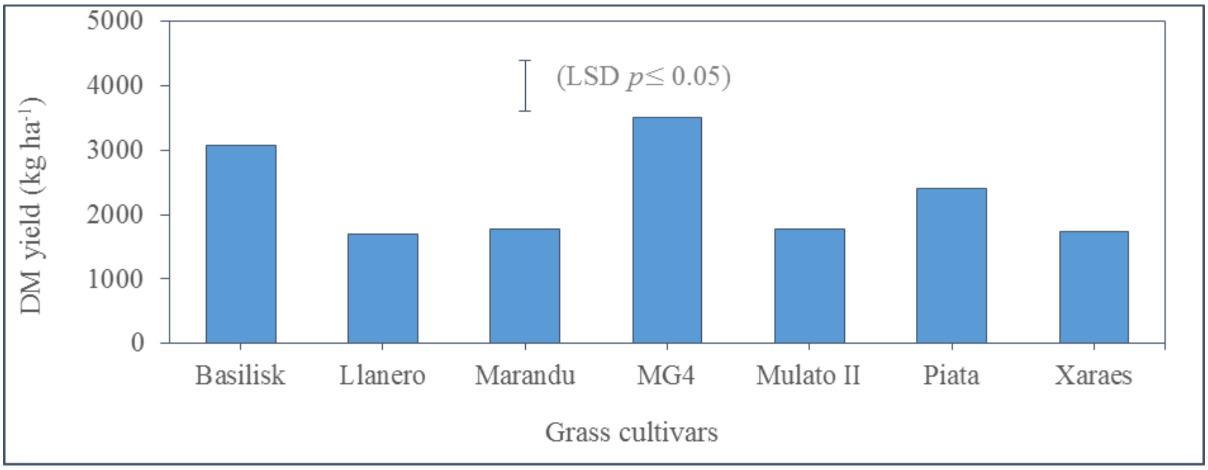

Fig. 9 b). Effect of cultivar on dry matter yield during the establishment phase at Msabaha site. Vertical bars represent LSD ($p \leq 0.05$).

Discussions

Low seedling emergence was recorded among the grass cultivars. This is evident, for Marandu and Basilisk at Mtwapa whereas Mulato II and Llanero at Msabaha site. The marked differences in plant numbers were attributed to the amount of rainfall received and species differences in seed germination rates. A total of 194mm compared to 370mm of rainfall was received at Msabaha and Mtwapa respectively.

Plant number

The cultivar Llanero recorded high plant numbers (28 plants m-2) followed by Xaraes (26 plants m-2) compared to *Chloris gayana* Rhodes grass ex-Tozi (27 plants m-2) at Mtwapa. Plant number increased from 4 weeks to 12 weeks and then declined later for *Brachiaria*. But Rhodes grass increased at 12 and 16 weeks. This variation could be as a result of amount of seeds a species has per unit weight.

A study by Machogu, (2013) reported that the quantity of seed materials contains different number of seeds, which accounts for differences in a plant density germination. In addition, grass species with light seeds (higher seed per unit weight) will likely have a higher plant density than those with bigger and heavier seeds. This results agreed with the findings by Cook *et al.* (2005), who found that 5kg of seeds for each of the cultivars will have different proportions of seed in terms of numbers and Rhodes grass will likely have 7250000 to 9 500 000 seeds per kg.

Therefore, this explains somehow the higher plant counts for *Chloros gayana* cv. Rhodes grass as compared to the other cultivars. In addition, Rhodes grass has shown the high seed viability and this could be attributed to their faster seed germination and establishment. In both sites, *Brachiaria* cultivars established low plant numbers.

Nevertheless, the plant numbers were higher at Mtwapa than at Msabaha. The high plant number in Mtwapa could as well be attributed to the sandy loam soils that are dominated by sand particles but contain clay and sediment to provide some structure and fertility.

Plant height

The plant height varied among the grass cultivars at Mtwapa. Piata was the tallest among the *Brachiaria* cultivars at 12 and 16 weeks respectively. This could be due to the vertical growth habit of Piata that explains why it was tallest. As reported by (Ogillo, 2010 and Opiyo, 2007) cultivars that germinate and grow faster with erect culms tend to be taller than those with slow growth rate and semi erect culms.

In this case, *Brachiaria* hybrid (Mulato II), which has semi erect culms, according to Pizarro *et al. (*2008) was among the tallest cultivar which was reported in Mtwapa and Msabaha. As reported by (Machogu, 2013), Mulato II was recorded the shortest in plant height. However, this was not similar in this study. Instead, it was among the tallest cultivars at 16 weeks after establishment due to favourable weather conditions during the period.

Tiller number

Brachiaria cultivars; Marandu, Llanero, Mulato II and MG-4 had high tillering capability among the cultivars in Mtwapa. The number of tillers increased progressively over time and this improved the chances of persistence for most grasses and that large number of tillers produced allowed grasses to attain relatively high DM at an early age. This concurs with Mganga, (2009) whose findings were that tillering ability complements both yield and resilience of grass stand under defoliation. In addition, Laidlaw, (2005) reported that tillering is important in forage plants as it influences on leaf area production and dry matter yield. The findings in this study, is however similar to findings by Mganga, (2009) who found out that the tiller numbers differed among the cultivars. Moreover, Wolfson (2000), reported that tillers that remain undefoliated for long decline and may cease to produce other stems especially where the grasses have spread and covered the ground.

At 16 weeks, Llanero recorded the highest tiller numbers in Msabaha while Mulato II recorded the highest at Mtwapa which are also in agreement with those of Cook *et al. (*2005) who reported that the tillering ability of Llanero is as a result of its growth habit.

Ground cover

The differences in ground cover were as a result of differences in seedling emergence and growth rate among the *Brachiaria* grasses. Ground cover increased over time for *Brachiaria* but declined for Rhodes grass; Piata has an erect growth habit that contributed to low ground cover. Llanero grass has stolons that grow in a pattern that allows it to spread and result into higher cover than the other *Brachiaria* cultivars. In this study, Llanero and Mulato II showed the fastest rate of lateral ground cover. Mostly, the cultivars which spread rapidly on the ground are more desirable than those which have vertical characteristics (Machogu, 2013). In addition, MG-4 also showed a sharp increase in ground cover at 4 to 8 weeks and a gradual increase at 12 and 16 weeks, enabling the grass to achieve an average of 71% ground cover. Mtwapa experienced relatively higher rainfall than at Msabaha site which may have stimulated vigorous growth hence cumulate high cover. Xaraes recorded a higher plot cover among the cultivars evaluated in Msabaha. However, low ground cover recorded in Msabaha could be due to low rainfall received during the experimental period.

Dry matter yield

Dry matter productivity of all forage species hold the key to livestock productivity (Hare *et al*., 2009). Dry matter yield was determined only once at 16 weeks. Xaraes attained the highest yields, followed by Marandu, Basilisk, MG-4 and Mulato II out performing Rhodes grass. The results concur with the findings by Rodrigues *et al. (*2014), who reported that Xaraes have greater leaves and stem elongation rates and a higher leaf blade which may have resulted in high biomass production in this study, since the stem is the structural component with higher weight than leaves. Also, the yields concur with the findings by Guiot *et al. (*2005) showing that Mulato II produced high primary dry matter yields above (3.9t ha^{-1}) while, Guiot and Melendez, (2003) reported, high dry matter yields of Mulato II as a result of large leaves (15.2' long and thick stems (1-1.5' width). In this study, variation in dry matter production could be as a result of differences in growth rate and growth habits among the cultivars. The highest dry matter yields were probably attributed to warmer temperatures (28^{o}C), and high rainfall during the establishment phase (370 mm). But low yields of Llanero in both sites could be as a result of its spreading growth characteristics, where the upright growth characteristics showed higher yields than the spreading growth habit. *B. decumbens* cv. Basilisk was among the highly performed cultivars in DM yield 7.69t ha^{-1} in Mtwapa. Similarly, Argel *et al.* (2007) reported that Basilisk is known to have a high capacity to extract soil nutrients, producing high biomass of over 25t ha^{-1} for above ground parts.

Generally, low yields were obtained in Msabaha due to low precipitation < 300mm received during the establishment period. The DM yield of 1.78t ha^{-1} obtained for Mulato II at Msabaha were lower far below the DM yield 4.1t ha^{-1} reported by Nguku *et al. (*2016) from the trial in semi-arid eastern of Kenya.

Conclusions

Brachiaria cultivars differed in establishment and growth in the Coastal lowlands of Kenya. The cultivars; Basilisk, Llanero, MG-4 and Piata were identified to emerge with high plant number, Mulato II highest tiller number, Llanero highest plant ground cover while Piata was tallest. In addition, Marandu, Xaraes, MG-4 and Basilisk recorded high dry matter yield. However, Marandu was slow to establish and therefore took time to build reasonable cover in Msabaha site. Generally, *Brachiaria* grass unlikely not be able to survive in areas that receive less than 700 mm rainfall annually with dry season exceeding four months during establishment phase.

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