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Emergence and Initial Growth of *Adenanthera pavonina* L. Enriched With Organic Compost

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A B S T R A C T

Substrates made from organic materials originated from composting agricultural organic wastes, constitutes available and profitable alternatives for farmers. However, plant's responsiveness to organic enrichment depends on the ~~plant~~ species, on the proportion and on the quality of such organic composts. Our objective was to determine the best substrate formulated with different proportions of soil and organic compost on the emergence and initial growth of *Adenanthera pavonina* L. The experiment was performed in greenhouse where treatments were arranged in a completely randomized design, comprised by organic compost and Latosol at proportions of: 0:100; 20:80; 40:60; 60:40; 80:20 (v:v). The emergence speed and speed index of emergence were evaluated in seedlings until 30 days after planted. Seedling height, stem diameter, number of leaves, dry mass of the aerial portion and roots, and their relationships~~,~~ were evaluated 90 days after sowing. The addition of organic compost originated from tree pruning added with cattle and goat manure to the soil, to compose the substrates, increased the percentage and emergence speed of seedlings. Seedlings showed higher Dickson Quality Index when cultivated on substrates composed of 53:47 (v:v) of organic compost:Latosol, therefore, being this one the recommended substrate formulation to produce this species seedlings.

Keywords: Cultivation substrates; leguminous plants; seedling production.

Emergência e Crescimento Inicial de *Adenanthera pavonina* L. Enriquecida com Composto Orgânico

R E S U M O

Os substratos feitos a partir de materiais orgânicos provenientes da compostagem de resíduos orgânicos agrícolas constituem alternativas disponíveis e rentáveis para os agricultores. Contudo, a capacidade de resposta das plantas ao enriquecimento orgânico depende da espécie vegetal, da proporção e da qualidade desses compostos orgânicos. O objetivo foi determinar o melhor substrato formulado com diferentes proporções de solo e composto orgânico na emergência e crescimento inicial de *Adenanthera pavonina* L. O experimento foi realizado em casa de vegetação onde os tratamentos foram dispostos em delineamento inteiramente casualizado, composto por composto orgânico e Latossolo nas proporções de: 0:100; 20:80; 40:60; 60:40; 80:20 (v:v). A velocidade de emergência e o índice de velocidade de emergência foram avaliados em mudas até 30 dias após o plantio. A altura das mudas, o diâmetro, o número de folhas, a massa seca da parte aérea e das raízes e suas relações nas mudas foram avaliados aos 90 dias após a semeadura. A adição de composto orgânico

proveniente de podas de árvores adicionado de esterco bovino e caprino ao solo, para compor os substratos, aumentou a porcentagem e a velocidade de emergência de mudas. As mudas apresentaram maior Índice de Qualidade Dickson quando cultivadas em substratos compostos por 53:47 (v:v) de composto orgânico:Latossolo, sendo está a formulação de substrato recomendada para produção de mudas desta espécie.
Palavras-chave: Substratos de cultivo; plantas leguminosas; produção de mudas.

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Introduction

Adenanthera pavonina L., commonly known as Carolina, Dragon's eye or Coral Wood, is an exotic leguminous tree from the family Fabaceae, subfamily Mimosoideae. It produces massive quantities of seeds annually, although these seeds show slow and irregular germination due to its tegument impermeability to water (Lorenzi, 2003). This species is widely used, form milled leaves used to remove metals in aqueous solutions (Sen et al., 2018), to urban forestation in tropical countries (Cao et al., 2012) or reforestation and recover of degraded areas (Nóbrega et al., 2008). Additionally, *Adenanthera pavonina* L. has been used in agroforestry, promoting biodiversity and improving soil health.

Adenanthera pavonina L. is found in various regions in Brazil; however, its potential uses are compromised due to seed dormancy, requiring the application of germination treatments to overcome the mechanical resistance of the seed coat (Joshi et al., 2022; Ramos et al., 2024). The dormancy of this species is attributed to the impermeability of the seed coat ~~to water~~, requiring the application of pre-germination treatments to overcome this barrier (Nautiyal et al., 2023; Ramos et al., 2024). To break the dormancy, seeds should be immersed in sulfuric acid or subjected to mechanical scarification, which involves sanding the seeds to weaken the seed coat, thereby facilitating water intake (Kumar et al., 2024; Moulay et al., 2023). Although it has potential for multiple purposes, studies on *A. pavonina* are limited to the homogenization of seed germination techniques, but studies concerning fertilization and enrichment in nurseries are uncommon.

The species is responsive to some types of substrates such sand, vegetal earth and fine vermiculite, as well as mixtures of sand + vegetal earth, vegetal earth + wood powder, fine vermiculite + wood powder at 1:1 ratio (Alves et al., 2015) and coconut powder (Souza et al., 2007).

Additionally, there is a growing interest to use *Adenanthera pavonina* L. in sustainable cultivation practices and in the regeneration of degraded soils, due to its nitrogen-fixing capacity and improvement of soil structure (Luo et al., 2023; Jadhavar & Deshpande, 2022). Recent researches are also exploring the potential of this species in regenerative agriculture systems, where its use can help to reduce the dependence on chemical fertilizers and enhance the resilience of the agricultural ecosystem (Webb et al., 2021; Ekka et al., 2024).

Nowadays planting arboreal leguminous species to recover degraded areas is a common technique and it's associated to their potential for fixing carbon (C) and nitrogen (N) to the soil and to its biomass production, with different patterns of degradation between species, according to their C/N ratios and their biochemical composition (Mahawar et al., 2020). Additionally, these species show moderated to high growth, thus protecting more demanding species from abiotic factors (Pereira e Rodrigues, 2012).

Another advantage of leguminous species is their ability to improve soil structure, increasing water infiltration and reducing erosion (Lebrazi & Fikri-Benbrahim, 2022; Liu et al., 2021). Planting leguminous species may contribute to preserve or improve the functions of soils in recovering process (Mahawar et al., 2020; Tariq et al., 2024).

Information which may help to produce good quality seedlings, in shorter periods of time and produced at low cost, are desirable in reforestation programs, besides increasing the viability and growth of seedlings in the field (Grossnickle et al., 2022). Therefore, organic residues originated from agricultural practices, have been used as components for cultivation substrates, whether as conditioner or as nutrient and carbon sources, aiming a better vegetal development, reduction of production expenses and aggregating value to agricultural residues, avoiding its gathering in the environment (Mariotti et al., 2020). Some arboreal species such as *Inga edulis*, *Leucaena leucocephala* (Lam.), *Bauhinia variegata* L. and *Caesalpinia pulcherrima* L. f., are responsive to organic fertilization during the seedling stage, showing suitable growth, with higher germination percentage and plant emergence speed;

improvement of different variables associated with initial growth such as the Dickson's Quality Index and production of dry mass, among others (Amaral et al., 2016; Araújo et al., 2016; Moreira et al, 2022; Manrique-Veja & Alvarado-Sanabria, 2023; Braulio et al., 2019).

In a study concerning the production of *Eucalyptus urophylla*, *Peltophorum dubium*, and *Eremanthus erythropappus* seedlings, substrates with alternative constituents outperformed commercial substrates in various metrics. Carbonized coffee husk was effective for the production of *P. dubium* and *E. urophylla* seedlings. The best formulations for *P. dubium* included 20% and 35% coffee husk combined with rice husk, coconut fiber, and cattle manure. For *E. urophylla*, the recommended mixture was of 50% carbonized coffee husk, 30% manure, and 20% coconut fiber, eliminating the need for carbonized rice husk. None of the tested formulations were suitable for the production of *E. erythropappus* seedlings (Silva et al., 2021).

Mendonça et al. (2021) aiming to perform the chemical and physical characterization of substrates based on organic residues and to evaluate the development of *Colubrina glandulosa* seedlings using composted residues of urban tree prunings, verified that treatments with higher proportions of organic compost resulted in better physical characteristics but also showed chemical limitations to seedling development. Treatments based on topsoil and aged manure with lower proportions of organic compost achieved the highest average results for height, stem diameter, height-to-diameter ratio, and Dickson Quality Index.

A study evaluating the morphological quality in the nursery and the initial field growth of *Senna multijuga* seedlings, planted in different substrates and proportions of organic residues, including residues of *Copernicia prunifera*, organic compost (OC), and decomposed stem of *Mauritia flexuosa* with the addition of Yellow Latosol samples, formulated at proportions of 0:100, 20:80, 40:60, 60:40, and 80:20 (residue:soil, v:v), concluded the combination of OC and soil at a 57:43 ratio provided the greatest seedling growth. In the field, seedlings cultivated with decomposed *Mauritia flexuosa* stem showed a higher survival rate, while those grown in OC-based substrate exhibited superior growth in height and stem diameter (Araújo et al., 2021).

In this respect, the use of organic compost may contribute to produce *A. pavonina* seedlings with better morphological qualities in shorter periods of time, increasing the efficiency of reforestation and urban forestation programs, in addition to constituting a feasible low cost and highly accessible alternative for farmers. Additionally, the use of organic compost can promote more sustainable and environmentally friendly agricultural practices, benefiting the environment in the long term (Fan et al., 2023). Thus, it is hypothesized that a substrate formulation composed of optimized proportions of organic compost derived from tree pruning, combined with soil and supplemented with cattle and goat manure, promotes greater emergence and more robust initial growth of *Adenanthera pavonina* L. seedlings compared to other tested substrates. In addition, to understand how this species behaves when cultivated in an organic-mineral substrate, which may be produced in small farms, aligns the present work to the objectives 2, 11, 12, 13 and 15 of the United Nations Transforming Our World: The 2030 Agenda for Sustainable Development (United Nations. "Transforming Our World: The 2030 Agenda for Sustainable Development." 2015. sustainabledevelopment.un.org. https://sustainabledevelopment. un.org/post2015/transformingourworld). Thus, the objective of the present study was to determine the best substrate formulated from different proportions of organic compost:soil, originated from tree pruning and added with cattle and goat manure, for the emergence and initial growth of *Adenanthera pavonina* L. seedlings.

Material and methods

The experiment was performed in greenhouse at the Federal University of the Recôncavo da Bahia (UFRB), Center for Agricultural, Environmental and Biological Sciences (CCAAB), in the county of Cruz das Almas – BA, Brazil, at coordinates 12º40'39" S latitude and 39º06'26" W longitude. The treatments were established in a totally random design, with five proportions of organic compost combined with soil in the following proportions: 0:100; 20:80; 40:60; 60:40; 80:20 (v:v; organic compost:soil), with 11 replicates.

The soil used to constitute the substrates was classified as a dystrophic cohesive YELLOW LATOSOL (Oxisol), collected at the UFRB *Campus* at a 40 cm depth. The organic compost was produced also at the UFRB *Campus*, from a compost pile constituted by tree pruning and cattle and goat manure, at a 3:1:1 ratio, respectively. These piles were irrigated during 90 days each 15 days in the open field. Then, soil and organic compost was dried and sieved trough a 4 mm net, homogenized and conditioned in 0.12 x 0.23 m polyethylene bags with 1.2 dm^{-3} volume. Chemical and physical characterization of the organic compost (Table 1) and the soil were performed by Moreira et al. (2018) and are showed, once samples to execute the present study were obtained from the same lot.

The soil had a pH (H_2O): 5.2; pH ($CaCl_2$): 4.5; P available: 11.2 mg kg^{-1}; K^+; 74 mg kg^{-1}; Ca^{+2}: 0.8 $cmol_c$ kg^{-1}; Mg^{+2}: 0.4 $cmol_c$ kg^{-1}; Al^{+3}: 0.3 $cmol_c$ kg^{-1}; Al+H: 2.6 $cmol_c$ kg^{-1}; Sum of bases: 1.4 $cmol_c$ kg^{-1}; T: 4 $cmol_c$ kg^{-1}; Base saturation: 35%; Aluminum saturation: 17.65%; OM: 14.4 g kg^{-1}; Sand: 535 g kg^{-1}; Silt: 281 g kg^{-1}; Clay: 181 g kg^{-1}; Humidity at – 33KPa: $0.111m^3m^{-3}$ (Moreira et al., 2018). Chemical attributes of the organic compost were described in humid basis: pH (H_2O): 7.0; pH ($CaCl_2$ 0,01 M): 6.4; Density: 1.0 g cm^{-3}; Humidity at 60 - 65°C:12.03%; Humidity at 110°C:0.69%; Organic Matter (Combustion): 10.64%; Organic Carbon: 5.27%; Total Mineral Residue: 76.64%; Mineral Residue: 5.76%; Unsolved Mineral Residue: 70.88%; Total Nitrogen: 0.62%; Total Phosphorus (P_2O_5): 0.20%; Total Potassium (K_2O): 0,22%; Total Calcium (Ca): 0,50%; Total Magnesium (Mg): 0.11%; Total Sulfur (S): 0.02%; C/N ratio: 9.0; Copper (Cu): 13 mg kg^{-1}; Manganese (Mn): 112 mg kg^{-1}; Zinc (Zn): 31 mg kg^{-1}; Boron (B): 206 mg kg^{-1}; Sodium (Na): 725 mg kg^{-1}. The characterization was carried out by Moreira in a batch of material used in several research trials (Moreira et al., 2018, Anjos et al., 2018, Braulio et al., 2019; Silva et al., 2020).

Seeds of *Adenanthera pavonina* L. were collected from different trees in the UFRB *Campus* in Cruz das Almas, and manually selected by removing damaged seeds. Before sowing seeds were mechanically scarified with the aid of an abrasive for wood, in order to eliminate the dormancy (Rodrigues et al., 2009). Five seeds were sowed per polyethylene bag. During the experimental period spontaneous plants were removed manually and irrigation was performed on alternated days, simulating conditions from commercial nurseries.

Up to 30 days after sowing, a dayly evaluation of seeds emergence was performed, in order to determine the percentage of emergence (% E), emergence speed (ES) and the emergence speed index (ESI) (Maguire, 1962). Plantlets showing open cotiledons above the substrate, characterized by possesing all the normal and complete structures, were considered as emerged. Thinning was executed after this period, leaving only one plant per bag.

Seedlings were collected 90 days after sowing to evaluate plant height of the aerial portion (cm $plant^{-1}$) (H), stem diameter (mm $plant^{-1}$) (SD), number of leaves (units $plant^{-1}$) (NL), height/diameter ratio (H/SD) and root length (cm $plant^{-1}$) (RL), with the aid of a graduated ruler and a 0.01 mm precision caliper. Later, plants were segmented in aerial portion and roots, dried in a forced air oven at 65ºC until a constant weight was observed. Then, the dry mass of the aerial portion (g $plant^{-1}$) (DMAP), dry mass of roots (g $plant^{-1}$) (DMR), total dry mass (g $plant^{-1}$) (TDM), ratio between the dry mass of the aerial portion and roots (DMAP/DMR) and Dickson's Quality Index (IQD), according Dickson et al. (1960), were evaluated.

All data were submitted to analysis of variance by the F test at 5% probability and when significant differences were detected, they were subjected to polynomial regression analysis using the statistical software SISVAR (Ferreira, 2014).

Results

The use of substrates added with different proportions of organic compost influenced variables of emergence and initial growth of *Adenanthera pavonina* L. seedlings, 90 days after sowing (**Table 1**).

Table 1. Mean square value of the emeregence percentage (%E), emergence speed (ES), emergence speed index (ESI), height (H), stem diameter (SD), height/diameter ratio (H/SD), number of leaves (NL), root lenght (RL), dry mass of the aerial portion (DMAP), dry mass of roots (DMR), total dry mass (TDM), ratio between height and dry mass of the aerial portion (H/DMAP), ratio between the dry mass of the aerial portion and roots (DMAP/DMR) and Dickson's Quality Index (IQD) in *Adenanthera pavonina* L. sedlings, 90 days after sowing, when cultivated in substrates constituted by different proportions of organic compost:soil.

FV[1]	LD[2]	Mean Square						
		%E	ES	ESI	H	SD	H/SD	NL
Prop.[3]	5	6.980**	7.39ns	0.979**	0.828**	0.075*	0.063ns	0.316*
Error	60	1.701	6.98	0.309	0.172	0.029	0.078	0.103
CV(%)		16.35	13.48	27.51	13.53	12.34	12.64	11.10
FV[1]	LD[2]	Mean Square						
		RL	DMAP	DMR	TDM	H/DMAP	DMAP/ DMR	IQD
Prop.[3]	5	4.255**	0.219**	0.218**	0.407**	2.321**	0.080**	0.054**
Error	60	0.991	0.039	0.015	0.050	0.492	0.006	0.007
CV(%)		24.80	26.93	30.79	26.83	15.96	15.57	22.96

[1]F.V.: Variation source; [2]L.D.: Liberty degree; [3]Prop.: Proportion; ns not significant at 0.05 probability; *Significant ($p<0.05$); **Significant ($p<0.01$) by the F test. F. Source: Barbosa (2017).

Regarding seed emergence, there was a significant effect ($p<0.01$) for the proportions of organic compost over variables % E and ESI. Regarding to the seedlings' morphological variables, a significant effect ($p<0.05$) was verified for most of the variables, except for the H/SD ratio (Table 1).

There was a linear and increasing tendency for organic compost proportions over variables % E and ESI, obtaining the higher mean values with proportions of 80:20 (organic compost:soil; v:v). An increase of 43 % (74.2) and 61 % (9.26) was observed for variables %E and IVE in seeds sowed in substrate with a proportion of 80:20 (organic compost:soil; v:v), when compared to seeds sowed in soil only (0:100; organic compost:soil) (Figure 1A and 1B).

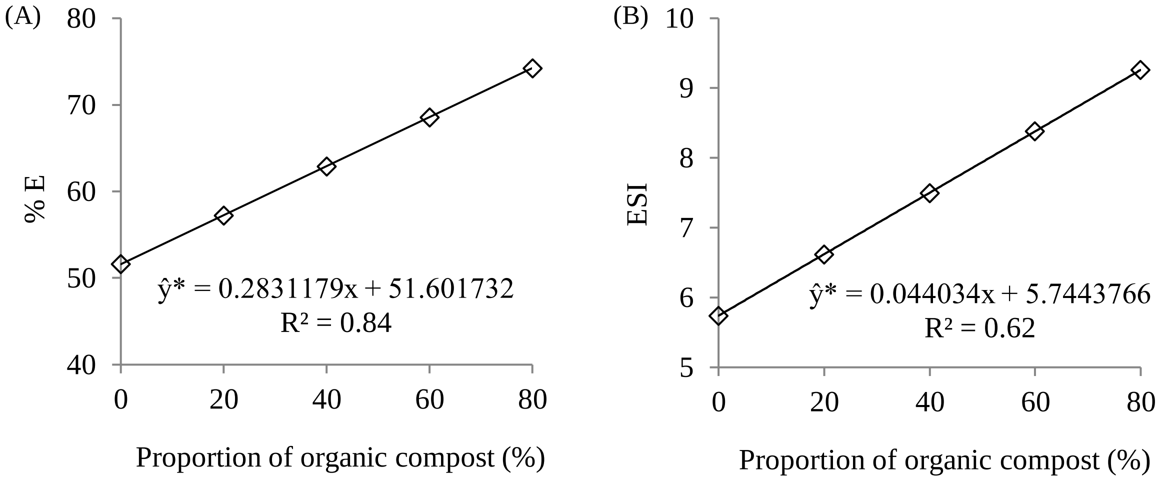

Figure 1. Percentage of emergence (% E) (A) and emergence speed index (ESI) (B) in *Adenanthera pavonina* L. seedlings under different proportions of organic compost:soil (0:100; 20:80; 40:60; 60:40; 80:20; v:v).

With reference to variables H, SD, NL, RL, DMAP, DMR, TDM, DMAP/DMR, H/DMAP and IQD observed in *A. pavonina* L. seedling, 90 days after sowing, quadratic tendencies ($p<0.05$) were observed for proportions of organic compost (Figures 2 and 3). Plants cultivated in substrate prepared with the estimated proportion of 45:55 (organic compost:soil) had the highest mean values for plant height (11 cm plant^{-1}) and stem diameter (2.2 mm plant^{-1}), resulting in an increment of 39% and 28%, respectively, when compared to the treatment with soil only (0:100; organic compost:soil) (Figures 2A and 2B).

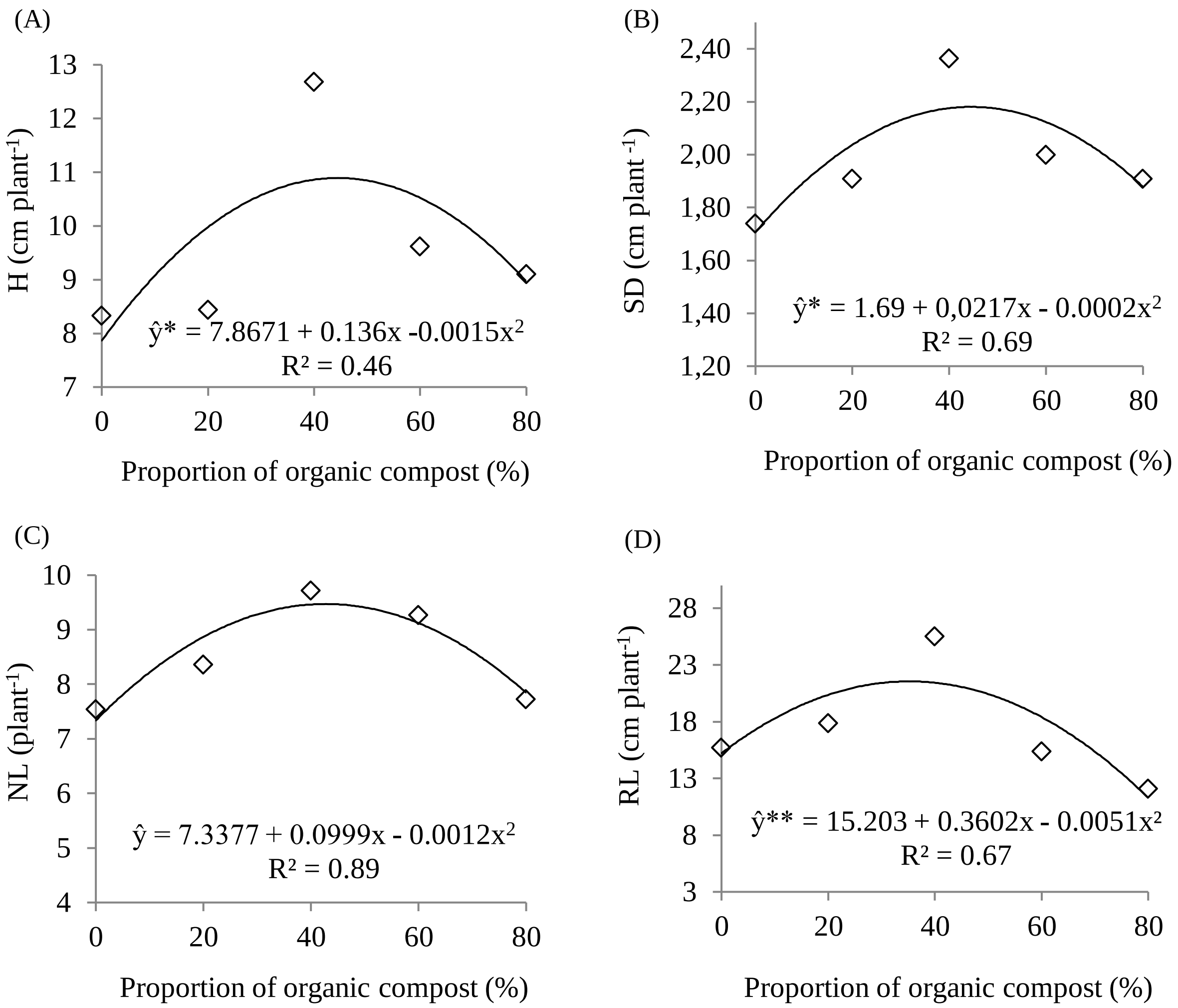

Figure 2. Height (H) (A), stem diameter (SD) (B), number of leaves (NL) (C) and root length (RL) (D) in *Adenanthera pavonina* L. seedlings under different proportions of organic compost:soil (0:100; 20:80; 40:60; 60:40: 80:20; v:v).

For NL, the maximum estimated proportion of 42:58 (organic compost:soil) promoted the highest mean value, with 9.4 leaves plant^{-1}, an increment of 28% when compared to the substrate prepared with only soil (Figure 2C). The highest RL (21.6 cm plant^{-1}) was obtained for the substrate constituted by the estimated proportion of 35:65 (organic compost:soil), which resulted in an increment of 42% in the RL when compared with plants in the substrate 0:100 (organic compost:soil) (Figure 2D).

A positive and quadratic effect was verified with the addition of organic compost over variables DMAP, DMR, TDM, DMAP/DMR, H/DMAP and IQD (Figure 3). The highest mean value for DMAP (0.74 g plant^{-1}) was obtained at the estimated proportion of 36:64 (organic compost:soil) with an increment of 107% when compared to the treatment with only soil (0:100; organic compost:soil) (Figure 3A). In the case of DMR and TDM, the substrate constituted by 39:61 (organic compost:soil) promoted an increment of 206% (0.30 g plant^{-1}) in TDM and 137% (1.08 g plant^{-1}) in TDM, when compared to the treatment with only soil (Figure 3B and 3C).

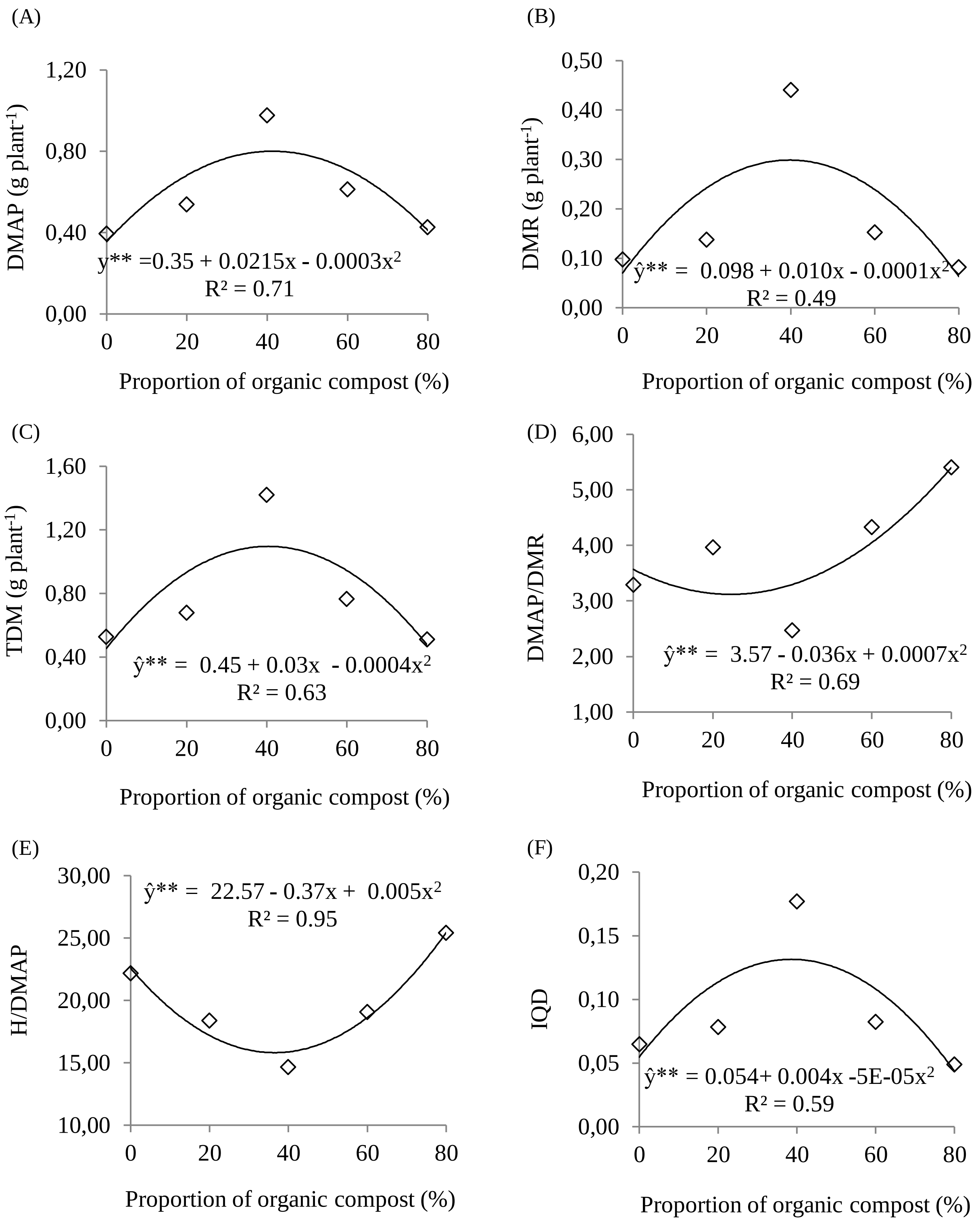

Figure 3. Dry mass of the aerial portion (DMAP) (A), dry mass of roots (DMR) (B), total dry mass (TDM) (C), ratio between the dry mass of the aerial portion and roots (DMAP/DMR) (D), ratio between height and dry mass of the aerial portion (H/DMAP) (E) and Dickson's Quality Index (IQD) (F) in *Adenanthera pavonina* L. seedling, under different proportions of organic compost:soil (0:100; 20:80; 40:60; 60:40: 80:20; v:v).

On the subject of the ratio between the dry mass of the aerial portion and dry mas of roots; and the ratio between height and dry mass of the aerial portion, the addition of organic compost to the cultivation substrate resulted in reduction until the estimated proportion of 26:74 and 36:64 (organic compost:soil, v:v), respectively, with values of 3.1 for DMAP/DMR and 15.84 for H/DMAP. The addition of compost beyond the proportions mentioned promoted an increase in the values of these variables (Figure 3D and 3E). Regarding the IQD, plants showed the highest values (0.123) when cultivated in the estimated proportion of 53:47 (organic compost:soil; v:v), that is to say 125% higher than those cultivated under the substrate constituted by only soil (0:100; organic compost:soil) (Figure 3F).

Discussion

In the present work, mean values for percentage of emergence were superior to those observed by Alves et al. (2015), where seeds showed 67% and 70% of emergence when cultivated in plastic boxes containing washed sand + cattle manure (1:1) and vegetal earth + cattle manure (1:1), respectively. This evidence the formulated substrates in the present work did not inhibit the development of seeds.

The positive effect on plant emergence by the addition of organic matter was previously verified in arboreal species such as *Tabebuia heptaphylla* (Reis et al., 2023) and *Caesalpinia spinosa* (Manrique-Veja & Alvarado-Sanabria, 2023). Moreira (2022) verified seeds of *C. pulcherrima* had higher percentages of emergence in substrates constituted by higher proportions of organic compost, which also showed higher capacity for water retention and equality of water distribution between seeds. In addition, organic matter increases the porosity and reduces density of the cultivation substrate (Delarmina et al., 2014), which may result in a lesser physical impediment and, consequently, higher plant emergence, as observed in the present work (Figure 1).

In studies developed by Araújo et al. (2021) regarding the production of *Senna multijuga* seedlings, it was verified that both ~~the~~ types of composts and their proportion in the formation of the substrate can influence the percentage of seedling emergence. Furthermore, the authors observed that, as the proportion of residues in the substrate constitution increased, there was an increase in the emergence speed index, as observed in the present study. It should be noted that the process of seed germination and emergence involves internal factors, related to the seed itself, and external factors, linked to the environment in which they are found. In this sense, the use of a substrate that offers adequate aeration, light, temperature and humidity stimulates the production of hormones and chemical substances, such as reactive oxygen species (ROS), favoring seed germination (Farooq, et al., 2022).

Organic matter has a relevant role improving the physical properties of the substrate, humidity, aeration and drainage, among others (Delarmina et al., 2014; Meena et al., 2021), which is essential during the growth and development stages of the plant. Additionally, the substrate must contain another relevant factor, availability of nutrients. The organic compost used as a source of organic matter and nutrients provided higher mean values of plant growth when compared to those cultivated in soil only. There was increment in plant height, stem diameter, number of leaves, root length, dry mass of the aerial portion and total dry mass and Dickson's Quality Index in *A. pavonina* seedlings up to a proportion of 40:60 (organic compost:soil), approximately (Figures 2 and 3). Costa et al. (2024), evaluating the same species grown in substrates made from poultry manure, observed that the morphological aspects of *Adenanthera pavonina* seedlings are significantly influenced by the composition of the substrate. The proportion of 25% chicken litter and 75% soil was considered the most suitable for the growth and production of dry mass of the seedlings, resulting in high quality seedlings In contrast, the use of 100% poultry manure prevented seed germination of this species.

In the majority of leguminous plants, the proportion of approximately 50:50 (organic compost:soil) has been recommended during the seedling formation stage. There are other recommendations for species, registered in the literature, such as *Leucaena leucocephala* in formulated substrate 50:50 (Latosol:organic compost from tree pruning) (Amaral et al., 2016), *Enterolobium contortsiliquum* cultivated at a proportion of 80:20 (40% of *Copernicia prunifera* residues, 40% chicken bed and 20% Latosol; v:v) (Araújo et al., 2016) and *Acacia mearnsii* cultivated in substrate 1:1 (vermicompost formulated from cattle manure:food residues; v:v) (Antunes et al., 2016). In light of this, is evident that proportion of organic material used to prepare cultivation substrates directly influences the quality of arboreal seedlings, as was verified in the present study. However, it should be noted that there are species that are not responsible for a particular substrate such *Clitoria fairchildiana*, in which their cultivation on the same substrate did not nodulate and did not increase growth variables and quality index (Silva et al., 2020).

The greater seedling growth of tree species in substrates containing approximately 50% organic compost, observed in most studies, may be related to improvements in the physical and chemical properties of the substrate, which provides adequate nutrients and aeration for the development of the seedlings (Araújo et al. 2021; Moreira et al., 2022; Bhunia et al., 2023; Manrique-Veja et al., 2023).In addition to the proportion of the organic matter used, its quality also influences directly on plant responsiveness. According to the Ministry of Agriculture, Livestock and Supply (2009), the organic fertilizer must contain, as a minimum, the following nutrient contents: Nitrogen + Phosphorus +Potassium>10%; Calcium+ Magnesium+Sulfur>5%; Boron>0.03%; Copper>0.05%; Manganes>0.05%; Zinc>0.1% and Total Organic Carbon>3%. Based on these, the organic compost used in the present study shows low macro-nutrient contents and average micro-nutrient contents (B>0.03; Cu>0.05; Mn>0.05; Zn>0.1%) and organic carbon (COT>3%). Even though the organic compost from tree pruning added with cattle and got manure has variable contents of nutrients when compared to the ideal compost, it has a higher diversity of elements than a mineral fertilizer (Rodrigues et al., 2011). Although showing low contents of macronutrients, according MAPA (2009), the organic compost mixed to the soil promoted a better quality of *A. pavonina* seedlings, 90 days after seeding.

Based on the results obtained in the present work the use organic compost as a source of organic matter and nutrients in substrates to produce seedlings of *Adenanthera pavonina* is promising. The utilization of agricultural organic residues to prepare cultivation substrates may reduce the use of mineral supplies in the production of this species' seedlings, which in addition to soil enrichment with nutrients and organic matter, may considerably increase the useful living period of sanitary landfills, once it will reduce the quantities of residues dropped through the utilization of residues in rural lands. The use of these materials is simple and may be used by small farmers taking advantage of animal manure within their properties. The morphological responses from seedlings of arboreal species promoted by the substrates constituted of soil and organic compost may reduce the period of time consumed by seedlings in the nursery, improve seedling quality and survivor rate in the field, enhance programs of re-vegetation, urban forestation and organic agriculture systems, which is aligned with the UN objectives for sustainable development.

Conclusions

The addition of organic compost from tree pruning supplemented with cattle and got manure to the soil, in order to constitute cultivation substrate, increased the percentage and emergence speed in *Adenanthera pavonina* L. seedlings.

Seedlings of *A. pavonina* L. showed higher Dickson's Quality Index when cultivated in substrates constituted of 53:47 (v:v) of organic compost:Latosol, therefore, this formulation proportions are recommended for the production of this species seedlings.

Conflicts of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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