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Weeds In The Vegetable Garden of The Town of Gagnoa (Côte d'Ivoire)

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Abstract: *Côte d'Ivoire is a predominantly agricultural country like many developing countries. However, farmers, the main players in this sector of activity, are supported by a major concern, which is the management of weeds. Indeed, these weeds are in direct competition with the cultivated plants and this causes a considerable decrease in productivity. Thus, to put in place an effective management of weeds, one needs to have a thorough knowledge of these species, in particular their floristic composition, their diversity and their ecology. The objective of this study is to inventory the weeds and identify the control methods mainly used against these plant species. To carry out this study, we carried out a semi-structured survey associated with surface surveys in order to gather information on the weeds. The results of the study showed that the most aggressive weeds against vegetable gardens are Amaranthus viridis, Dactyloctenium aegyptium, Digitaria horizontalis and Phyllanthus amarus and the most harmful species are Cyperus rotundus, Phyllanthus amarus and Ageratum conyzoides. Chemical control and manual control are the methods commonly used by gardeners to control weeds in their gardens. The floristic inventory identified 14 plant species. These species are divided between 14 genera and 8 families. The families of Poaceae, Compositae and Cyperaceae are the most represented.*

Keywords : *Vegetable gardens, weeds, inventory, wrestling, Gagnoa*

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I. Introduction

The boundaries between cities and farmland are becoming blurred[1]. At the same time, homes are growing with the increasing desire of the population to be closer to nature and to grow food plants in order to find the pleasure of eating more fresh and healthier[1]. Allotment gardens or kitchen gardens meet all of these needs. In addition, beyond their food functions, these gardens have other functions. In France, vegetable plots have a tourist utility with more than 700,000 visitors per year[2] and an ornamental function[3]. In Côte d'Ivoire, in particular, vegetable plots are practiced primarily for food and economic purposes. This is the case of the kitchen gardens of N'Ganon and Nangounkaha, in northern Côte d'Ivoire, which provide school canteens in these villages with local food and of quality[4]. These gardens are therefore a real source of food for the populations because their productions allow the producers to provide for the needs of their families. For the prisoners, the vegetable plots offer the possibility to eat the products more fresh and allow to know the pleasure of the work, far from the constraints of the prison.

However, vegetable plots, in general, are faced with a major difficulty which is the presence of self-propagating plants called weeds. Weeds have always been an important nuisance for all types of agriculture, except those above ground. The heat and redundancy of the rains during the farming season favor the development of these self-propagating plants[5]. They are the direct competitors of the cultivated plants. Indeed, crop self-propagating plants are responsible for 5% of crop losses in temperate areas and more than 25% in tropical areas[5]. They are a major obstacle to the development and production of crops[6].

Weed management is a major concern for farmers. Thus, to put in place an effective management of self-propagating plants, we need to have a thorough knowledge of these species, in particular their floristic composition, their diversity and their ecology. This approach leads to a precise knowledge of the ecological and agronomic factors that will influence the development of species or self-propagating plants communities[7,8]. As a result, it becomes possible to act on these factors to control the grassing over of a plot.

In order to provide an answer to all these difficulties faced by farmers, several studies have been carried out. This is the case of studies carried out by[9] on the inventory of self-propagating flora in pineapple cultivation in the town of Bonoua in the south of Ivory Coast. Other studies, such as those carried out by[10] on the ecological impact of glyphosate resistant transgenic maize crop simulation; the study on the repetitive effect of a herbicide treatment on self-propagating plants flora in Côte d'Ivoire; those carried out by[11] on the aspect of grass encopement dynamics by *Euphorbia heterophylla* L. (Euphorbiaceae) and the study carried out by[12] on the biology and ecology of *Euphorbia heterophylla* L. (Euphorbiaceae) in cotton culture , in the north of Cote-d'Ivoire. However, few studies exist on self-propagating plants in vegetable plots. During the preliminary investigations carried out, no weed study was found in vegetable plots in Côte d'Ivoire, particularly in the town of Gagnoa. The present study aims, in general, to know the weeds of the vegetable plots of the city of Gagnoa and the means of struggle practiced by the gardeners to fight these harmful species.

II. Study Environment

This study was conducted in Gagnoa (Figure 1), a city located in the GOH region in west-central of Côte d'Ivoire on the road link Abidjan-Issia, 85.7 km after Divo. The town of Gagnoa is located between latitudes 5 ° 55'and 6 ° 15'Nord and longitudes 6 ° 00'and 6 ° 30'West. With a surface area of 160 km², it is bounded to the north and west respectively by the departments of Sinfra and Issia. In the south and the east, we have the departments of Lakota and Oume. The soils of the commune of Gagnoa are of sandy-clay texture[13]. This town is rich in shallows, with alluvial deposits whose dominant composition is clay-silty[13].

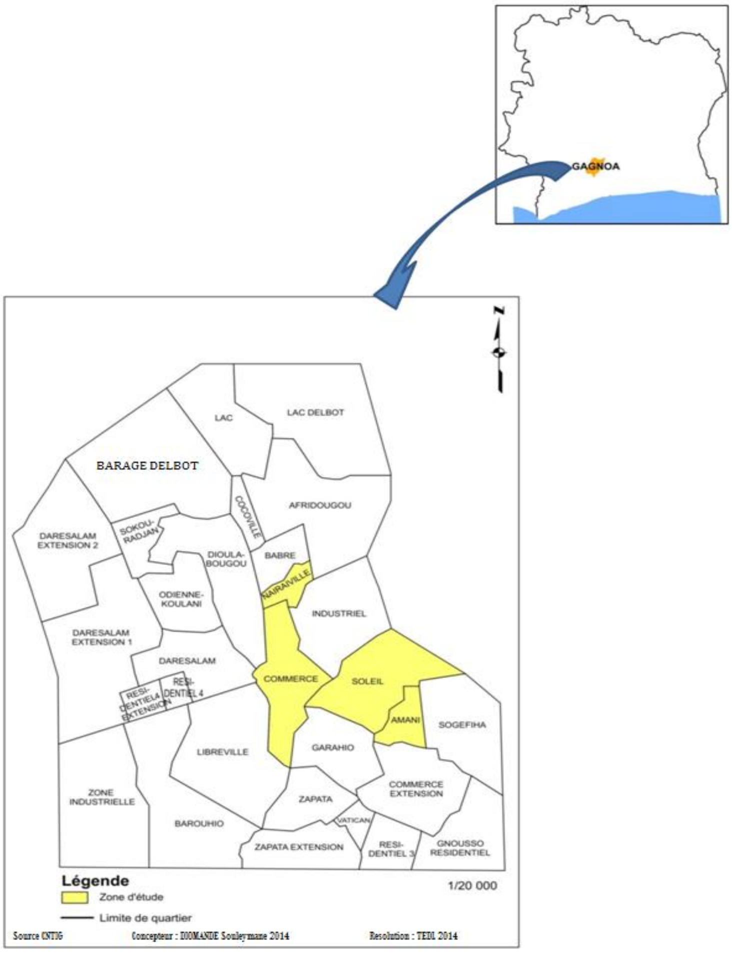

Fig 1: Location of the vegetable plots studied in the city of Gagnoa

III. Material And Methods

The material used consists of weeds, newsprint, plastic bags, tape and survey sheets (Appendix 1).

The study began with field visits and preliminary surveys of gardeners, which resulted in the selection of sites for the study. Out of a total of 22 kitchen gardens visited, eight were selected (Table 1) on the basis of their surface area, the availability of gardeners and the relevance of the information collected. The study took place between June and September 2013.

Surveys were conducted among gardeners spread over all the study plots. They focused on:

- the proliferation mode;
- the methods and frequencies of maintenance of the plots;
- species of special concern;
- the usefulness of gardening.

Following these surveys, floristic surveys were carried out. The observations were made in plots of culture subdivided into square plots of 1m ² arranged on contiguous ridges. The delimitation of the observation surfaces was inspired by the floristic studies of[9,12,14,15]. Within each plot, the inventory of self-propagating plants was carried out. The data collected were analyzed using qualitative and quantitative approaches.

The qualitative floristic analysis allowed to define the composition of the adventitious flora of the cultures of the zone of study. It also made it possible to determine the fragmentary floristic richness, the index of floristic diversity, the coefficient of similarity and the biological types.

The quantitative floristic analysis allowed to define the agronomic importance of the different species taking into account their relative frequency and their average abundance/dominance[16]. The infestation diagram is represented by the positioning of the species on a graph where the relative frequency of the species in a survey set is plotted on the abscissa and their mean abundance-dominance is plotted on the y-axis. It allows to differentiate groups of species according to their degree of infestation, therefore of their agronomic importance. The abundance index used is the abundance index - average dominance. This gives the species a similar weight in the graph and makes it easy to define the sectors corresponding to the different groups[17]. Different authors have shown that there is a good correlation between the frequency and abundance of species[18].

For the unknown species, samples were collected and a herbarium was set up for identification. The identification was made thanks to illustrated flora and the help of some specialists. Sites such as African Plant Database, Plant List and malherbologie.Cirad.fr have made it possible to update the names of species and botanical families. Species identity has been confirmed at the National Floristic Center of Félix Houphouët-Boigny University.

Table 1: Characteristics of the eight kitchen gardens visited

Districts	**Vegetable plots**	**Surface area (m^2)**	**Crops**
Amani	JA	214	*Capsicum annum* (chilli)
			Lactuca sativa (Salad)
			Solanum melongena (Aubergine)
Commerce	JCHR	288	*Capsicum annum* (chilli)
			Lycopersicon esculentum (Tomato)
			Solanum melongena (Aubergine)
			Zea mays (Maïze)
	JYS	446	*Brassica oleracea* (Cabbage)
			Capsicum annum (Chilli)
			Solanum melongena (Aubergine)
	JP	203	*Brassica oleracea* (Cabbage)
			Zea mays (Maize)
Nairaiville	JK	159	*Capsicum annum* (chilli)
			Solanum melongena (Aubergine)
			Zea mays (Maize)
	JG	257	*Brassica oleracea* (Cabbage)
			Capsicum annum (Chilli)
	JPC	511	*Brassica oleracea* (Cabbage)
			Capsicum annum (Chilli)
			Solanum melongena (Aubergine)
			Zea mays (Maize)
Soleil	JECR	352	*Brassica oleracea* (Cabbage)
			Lactuca sativa (Salad)

JA : Famille Amani ; JCHR : Centre Hospitalier Régional ; JYS : Famille Yacouba Sylla ; JP : Maison du PDCI ; JK : Famille Kouhon ; JG : Place Gbagbo ; JPC : Prison civile ; JECR : Ecole Christ Roi

IV. Data Processing

To facilitate the analysis and processing of the data, the name of the plant species has been redefined according to the principle of Bayer's codification[19]. According to this method, the first three letters are associated with the first two letters of the specific epithet.

Absolute frequency (Fa) :

The absolute frequency of each species (Fa) is equal to the total number of its occurrences in all the surveys made.

Relative frequency (Fr) :

Frequency of a given plant species as defined by the ratio of its absolute frequency (Fa) to the total number of surveys (Nr) performed at a given site[20].

It results in the following expression :

$$Fr = \frac{Fa}{Nr}$$

Fa = absolute frequency
Nr = the total number of surveys

This value is frequently expressed as a percentage; it is called a centesimal frequency :

$$Fr\ (\%) = \frac{Fa}{Nr}\ X\ 100$$

Specific diversity index:
This index reflects the state of diversity of the flora of the study environment. It is expressed as follows :

$$Ids = \frac{E}{G}$$

E = Number of species
G = Number of types

Coefficient of similarity (Cs):
The similarity coefficient permits to establish the similarity between flora from the different sites in the locality of the study. It was calculated from the formula of[21], reported by[22,23] and is expressed as follows:

$$Cs = \frac{2c}{a + b}\ X\ 100$$

a and **b** represent the lists of the species recorded respectively in the two sampling units that we want to compare, and **c** the number of species common to both lists a and b. According to this formula, the value of the similarity coefficient (CS), expressed as a percentage, varies between 0 and 100%, depending on whether the two lists have totally different floristic compositions (in this case, they do not include any common species and c = 0) or are strictly identical (then we have **a** = **b** = **c**). When the similarity coefficient is greater than or equal to 50%, the two environments are considered floristically similar.

Average Dominance Abundance Index: The average abundance of a species in a set of surveys is represented by its average abundance / dominance index, AD avg (e). This is the average of the abundance / dominance indices of the species AD (e), calculated in relation to the number of surveys in which the species is present Fa (e).

$$A/Dmoy(e) = \frac{\sum A/D\ (e)}{Fa(e)}$$

where : ΣA / D (e) is the sum of the abundance-dominance of a species in all surveys
Fa (e) is the absolute frequency of the species

V. Results

Floristic richness

The adventitious flora established from the 58 surveys carried out consists of 14 species distributed among 14 types and belonging to eight families. Dicotyledons and Monocotyledons are each, represented by seven species, ie 50% per class (Table 2). Of all the families surveyed, three are dominant because they account for 64% of all species. They are in order of importance, Poaceae (36%), Compositae and Cyperaceae with 14% each (Figure 2). In the study sites, each inventoried species is represented by a single type (Ids = 1).

Table 2 : List of weeds species

Plants' codes	species	Class	types	Families
Amasp	*Amaranthus viridis* L.	D	*Amaranthus*	Amaranthaceae
Ageco	*Ageratum conyzoides* (L.) L.	D	*Ageratum*	Compositae
Spiul	*Spilanthes uliginosa* Sw.	D	*Spilanthes*	
Cypro	*Cyperus rotundus* L.	M	*Cyperus*	Cyperaceae
Kyler	*Kyllinga erecta* Schumach.	M	*Kyllinga*	
Euphe	*Euphorbia heterophylla* L.	D	*Euphorbia*	Euphorbiaceae
Mimpi	*Mimosa pigra* L.	D	*Mimosa*	Fabaceae
Phyam	*Phyllanthus amarus* Schumach. & Thonn.	D	*Phyllanthus*	Phyllanthaceae
Brala	*Brachiaria lata* (Schumach.) C.E.Hubb.	M	*Brachiaria*	Poaceae
Dacae	*Dactyloctenium aegyptium* (L.) Willd.	M	*Dactyloctenium*	
Digho	*Digitaria horizontalis* Willd.	M	*Digitaria*	
Penpo	*Pennisetum polystachion* (L.) Schult.	M	*Pennisetum*	
Stela	*Steinchisma laxum* (SW) Zuloaga	M	*Steinchisma*	
Porol	*Portulaca oleraceae* L.	D	*Portulaca*	Portulacaceae

D : Dicotyledon ; M : Monocotyledon

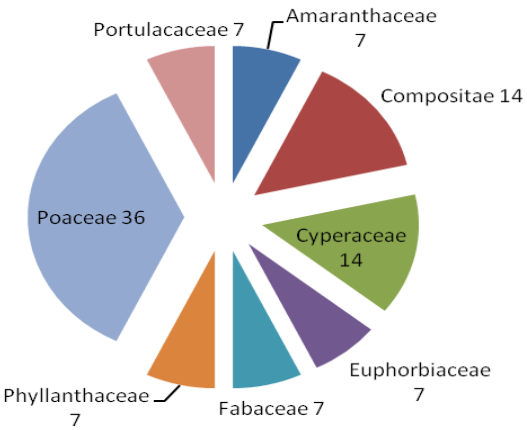

Fig 2: Percentage of self-propagating plants families identified

Plot floristic wealth: Out of the 58 surveys, the average number of species obtained per survey is 9.26. The floristic richness at the plot scale varies from 8 to 14 per survey (Figure 3).
The vegetable plot of the Civil Prison (JPC) has the highest plot of land of floristic wealth with 14 species. With eight species, the vegetable plots JCHR, JP and JYS have the lowest floristic wealth. As for other gardens, there are two that contain 10 species (JECR and JK) and the other sites contain 9 and 11 species. These are respectively the JA and the JG (Figure 4).

Coefficient of similarity: Taking into account the 50% threshold for determining floristic homogeneity, the analysis in Table 3 indicates that the self-propagating flora of the study area is floristically similar because their similarity coefficient is greater than 50%. . Indeed, it is between 73 to 95%.
Biological types: The self-propagating flora of Gagnoa's vegetable plots belongs to 4 biological types which are Therophytes, nanophanerophytes, geophytes and hemicryptophytes. The best represented biological types are Therophytes, represented by eight species, ie 57.14%, followed by nanophanerophytes with three species, ie 21.43% (Figure 5 and Table 5).

Degree of self-propagating nuisance
Relative frequencies: The analysis of the relative frequency of species (Table 5) shows 5 classes of species. The species whose frequency is between 80 and 100% (class V) are six in number. These are Cyperus rotundus (100%), Dactyloctenium aegyptium (89.66%), Pennisetum polystachion (91.38%), Phyllanthus amarus (100%), Portulaca oleracea (84.48%) and Steinchisma laxum (96.55%).). Class IV (between 60 and 80%) contains three species: Ageratum conyzoides (68.97%), Brachiaria lata (67.24%) and Digitaria horizontalis (62.07%). Class III (40 to 60%) contains 2 species: Amaranthus spinosus (58.62%) and Mimosa pigra (44.83%). As for the species Euphorbia heterophylla (27.59%), it belongs to class II (20 to 40%). Relative frequencies below 20% (class I) include 2 species that are Kyllinga erecta var erecta (17.24%) and Spilanthes uliginosa (17.24%).

Infestation diagram: The surveys carried out revealed 5 groups of species (Figure 6). These different groups (Table 4) reflect the potential for harmfulness and the agronomic importance of weeds:

• Group 1 (G1) gathers general major weeds. These are the most harmful species of crops. This group is represented by: Ageratum conyzoides, Cyperus rotundus and Phyllanthus amarus. Their great capacity of adaptation to the environment confers them a potential of important invasion of the plot.
• Group 2 (G2) is that of general potential weeds. It is represented by Dactyloctenium aegyptium which is a ubiquitous weed whose degree of infestation is less than that of the representatives of group 1.
• Group 3 (G3), represented by Brachiaria lata, Digitaria horizontalis, Pennisetum polystachion, Portulaca oleracea and Steinchisma laxum. These species are present in almost all surveys with an average abundance of less than 1.25 and a relative frequency greater than 50%. They are general weeds.
• Group 6 (G6) counts so-called regional weeds. In this group we note Euphorbia heterophylla and Mimosa pigra.
• Group 9 (G9) includes minor weeds. These are non-harmful species. They are represented by Kyllinga erecta and Spilantes uliginosa.

VI. Methods Of Control

The manual method is the most used by gardeners(Table 6). In fact, 50% of them only practice manual control, while 12.5% only engage in chemical control. When other gardeners, 37.5%, they combine the two methods of struggle (manualachemical).

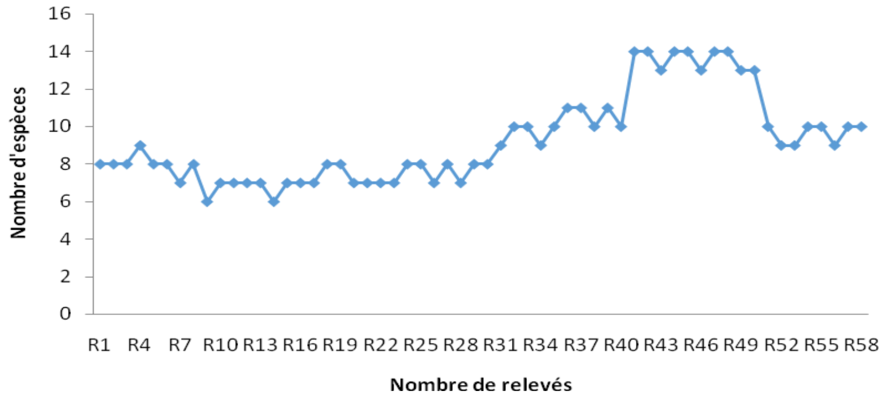

Fig 3: Floristic wealth by survey

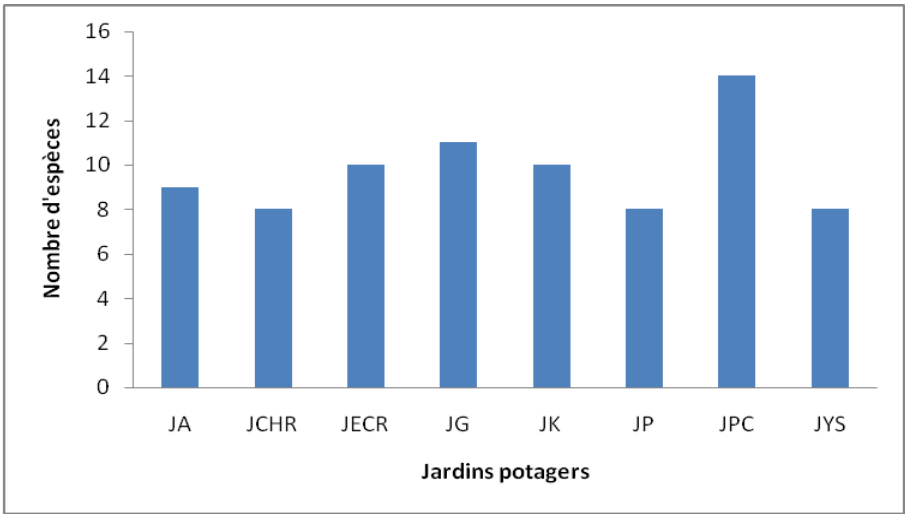

Fig 4: Plot floristic richness

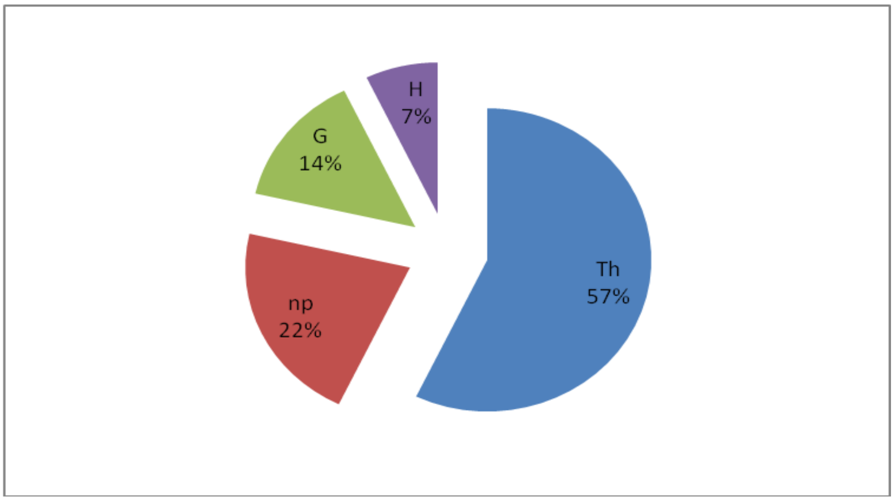

Fig 5: Biological type of species

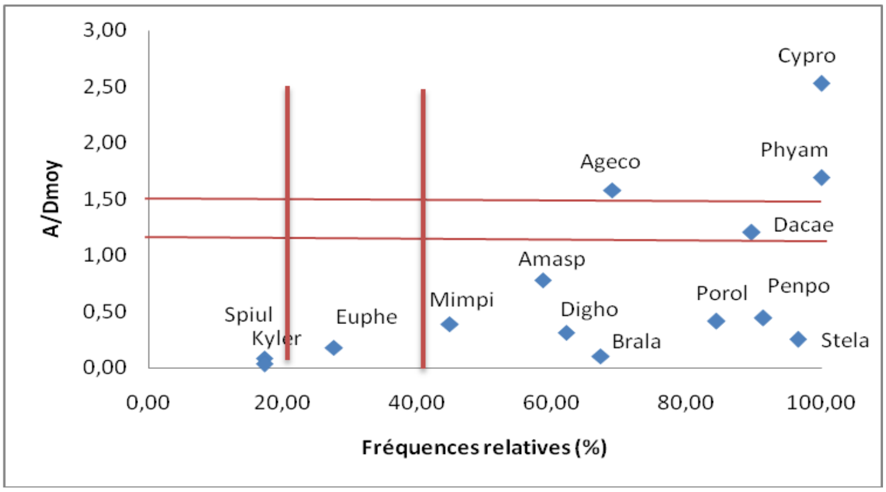

Fig 6: Infestation diagram of self-propagating plants in Gagnoa's vegetable plots

Table 3: Coefficient of similarity

Sites	JA	JCHR	JECR	JG	JK	JP	JPC	JYS
JCHR	0.82							
JECR	0.84	0.89						
JG	0.90	0.84	0.95					
JK	0.95	0.89	0.90	0.95				
JP	0.82	0.75	0.78	0.74	0.78			
JPC	0.78	0.73	0.83	0.88	0.83	0.73		
JYS	0.82	0.86	0.89	0.84	0.78	0.75	0.73	-

Table 4: Species by frequency class and corresponding biological types

frequency	species	Relative Frequencies (%)	TB
	Cyperus rotundus	100	G
	Phyllanthus amarus	100	np
V (80 to 100 %)	*Steinchisma laxum*	96,55	Th
	Pennisetum polystachion	91,38	np
	Dactyloctenium aegyptium	89,66	H
	Portulaca oleracea	84,48	Th
	Ageratum conyzoides	68,97	Th
IV (60 to 80 %)	*Brachiaria lata*	67,24	Th
	Digitaria horizontalis	62,07	Th
III (40 to 60 %)	*Amaranthus spinosus*	58,62	Th
	Mimosa pigra	44,83	np
II (20 to 40 %)	*Euphorbia heterophylla*	27,59	Th

I (-20 %)	*Kyllinga erecta*	17,24	G
	Spilanthes uliginosa	17,24	Th

Th : Therophyte ; np : nanophanerophyte ; G : geophytes ; H : hemicryptophyte

Table 5: Distribution of Weeds by Relative Frequency and Average Dominance abondance.

Groups of self-propagating plants	Relative Frequency (fr)	Abondance dominance (A/D aver)
General major weeds	> 50 %	> 1,5
General potential weeds	> 50 %	1,25 < A/D aver. < 1,5
General weeds	> 50 %	< 1,25
Regional major weeds	20 %< fr < 50 %	> 1,5
Regional potential weeds	20 % < fr < 50 %	1,25 < A/D aver. < 1,5
Regional weeds	20 % < fr < 50 %	< 1,25
Local major weeds	< 20 %	> 1,5
Potential local weeds	< 20 %	1,25 < A/D aver. < 1,5
Minor weeds	< 20%	< 1,25

Table 6: Rate of use of different methods of self-propagating plants control.

Methods	Vegetable plots	(%)
Manual and chemical	3	37,5
Manual	4	50
chemical	1	12,5
Total	8	100

VII. Discussion

Floristic richness

The self-propagating flora of the vegetable plots of the city of Gagnoa consists of 14 species obtained from 58 surveys. The presence, distribution and abundance of these weeds may be due to tilling techniques and control methods used to control these species at each study site. This flora, relative to the areas of plots, could be explained by the land constraints faced by gardeners, thus obliging them to regularly exploit reduced surfaces thus causing a strong disturbance of the soil which favors the proliferation of self-propagating plants[24]. With an annual rainfall of between 1400 and 2000 mm of rain according to[13], the town of Gagnoa remains relatively humid all year round, which is also favorable for the germination of seeds of weeds buried in the ground. Ploughing or manual labor could also explain the proliferation of self-propagating plants by soil preparation work that would place seeds buried on the surface under better germination conditions. This flora is however less rich than that of several authors such as[25,24,13,16]. Indeed, this flora has been inventoried in smaller areas than those of these authors. The percentage of Dicotyledons and Monocotyledons is the same, unlike those of several other authors who show a strong importance of Dicotyledonous compared to monocotyledons. We can mention[25,26,27,9] which mention a proportion of about 2/3 of Dicotyledons and 1/3 of Monocotyledons in their studies. The equal proportion of Dicots and Monocotyledons in this study is thought to be due to the low number of species inventoried in all study sites.
The prevalence of Poaceae, Compositae and Cyperaceae in our study area is in line with the observations made by many authors[28,29,30,31,32,12] who worked in tropical region on the flora of the harmful plants of the cultivated environments. These authors, in their various works, mention these families as containing the most dominant weeds. [8] explains the phenomenon of dominance of families with many species by their adaptation to different environments. He also explains that the Compositae are largely anemochorous and can sow rapidly the cultivated environments as is the case in this study with a high density of Ageratum conyzoides.
The fragmented floristic richness and the coefficient of similarity show that one meets almost the same species in the self-propaganting flora of the vegetable plots of the city of Gagnoa. However, the JPC is the site that shelters all listed species. This could be explained by its proximity to a shallow. This offers a high variability of self-propaganting plants due to the almost permanent presence of water and a high accumulation of nutrients[23].
The high proportion of Therophytes may be due to the fact that all the study plots were open areas. This is favorable for heliophilous species, especially Therophytes. This dominance of Therophytes may also be due to the fact that these species are the first to be established from the first work of plot preparation in the agricultural practices of intertropical Africa in general[12]. According to[17], this high rate of therophytes indicates cultural habitats often disturbed by agronomic interventions. The repeated work of the soil tends to eliminate the perennial species in favor of the Therophytes[33]. According to[33], the abundance of Therophytes can be explained by the high representativeness of seasonal immersion habitats, which are conducive to the development of annual plants with rapid germination and growth. This is also confirmed by the fact, established by[34] that if tilling perfectly destroys woody species (phanerophytes and chamephytes) or herbaceous species

(hemicryptophytes), it has a much more nuanced action on biological types adapted to disturbances such as perennials with high vegetative propagation capacity (geophytes) or especially annual plants (Therophytes). For the latter, the destructive action is largely compensated by the beneficial impact of the burial of seeds.

Infestation diagram

The relationship between average abundance and relative frequency gives an idea of the potential risk of aggression and harmfulness to the species[35].

The analysis of the relative frequency of the species highlights 5 classes of species, which show their potential for harmfulness and therefore their agronomic importance[36]. The species *Cyperus rotundus*, *Dactyloctenium aegyptium*, *Pennisetum polystachion*, *Phyllanthus amarus*, *Portulaca oleracea* and *Steinchisma laxum* with a frequency between 80 and 100% are the most harmful species at the scale of all sites.

If we set a threshold of 10% relative frequency, all species have a significant nuisance on all plots. This result is close to that obtained by[17], which has been able to determine 70 harmful species vis-à-vis the winter cereals of the high Constantine plains.

The species *Ageratum conyzoides*, *Cyperus rotundus* and *Phyllanthus amarus* are the major general weeds. They are invasive and worrying for gardeners. The species *Ageratum conyzoides* in this list causes difficulties for farmers as noted[37]. This author mentions that *Ageratum conyzoides* is a species which, punctually, is very abundant and causes enormous problems in agriculture. It also reveals that *Euphorbia heterophylla*, which is a regional weed in our study, is recognized for its very high germination capacity (more than 900 seedlings / m2 up early in the season), its high growth rate (flowering 40 days after emergence) and its gradual emergence[12,36], when conditions are favorable.

Amaranthus spinosus, *Brachiaria lata*, *Digitaria horizontalis*, *Pennisetum polystachion*, *Portulaca oleracea* and *Steinchisma laxum* are general weeds. They also have significant infestation potential. Indeed, according to[9] *Digitaria horizontalis* and *Ageratum conyzoides* deserve special attention because they represent the most harmful species to crops. These observations have also been made by several authors including[38,39,40]. The identification of *Brachiaria lata* and *Portulaca oleracea* in this group confirms the observations of[5] that the presence of these two species is favored by fertilization.

The general, potential regional and general groups constitute the core of the weed communities of the vegetable plots in this locality.

Kyllinga erecta and *Spilanthes uliginosa* are the group of species with moderate levels of infestation, also known as minor weeds. They do not generally represent an embarrassment for the culture but they occupy the cultivated space. It is therefore appropriate to eliminate them like all other species. But, self-propagating plants are known as species that evolve in time and space. Therefore, control strategies for these species must be adapted to each condition[41].

The means of weed control differ from one garden to another depending on the means available to each gardener. The most used technique is the manual fight. These observations corroborate those of[19]. According to this author, agricultural work is a major contributor to the reduction of weeds in both annual and perennial crops. Indeed, from our investigations, it appears that most gardeners use manual control although it is relatively difficult and slow. Nevertheless, it is most practiced by gardeners who have little financial means to afford phytosanitary products. The vast majority of gardeners interviewed combine the two methods of struggle. These results are similar to those of[42]. For this author, chemical weeding complements manual control and also eliminates weeds; but the chemical fight can not in any case replace the manual struggle because it requires more financial means to the gardens.

VIII. Conclusion

The vegetable gardens in the town of Gagnoa are home to a diverse weed flora. The presence and / or abundance of weed species are characteristic of the working conditions of gardeners. Thus, the kitchen garden of the Gagnoa civil prison houses all the different types of weeds identified. In total, a list of 14 weed species divided into 14 genera and 8 families has been inventoried. This flora is characterized by the predominance of Poaceae (36%), Compositae (14%) and Cyperaceae (14%). *Ageratum conyzoides*, *Cyperus rotundus* and *Phyllanthus amarus* are the most common and abundant species. They represent the major general weeds in the kitchen gardens of the town of Gagnoa, giving them a very high degree of damage to crops. The species *Kyllinga erecta and Spilanthes uliginosa*, as minor weeds, represent less of a hazard to crops but are nevertheless a problem as they occupy space. The determination of the biological types, with a dominance of Therophytes (57,14%), made it possible to better characterize this flora and to identify the main problematic species.

This study, which is an opening door on the problem of the management and control of weeds in vegetable gardens, could be spread all over the national territory in order to inventory all the weed species in vegetable gardens and then set up an integrated pest management program that will be accessible to all. Apart from products from vegetable gardens that are useful for consumption, vegetable gardens have ornamental and environmental protection functions.

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