

The Brazilian horticultural agronomist between gardening and landscaping

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Abstract

In Brazil, which professional is responsible for the implementation of urban horticultural projects? Given the fact of recent courses in horticulture and the non-existence of the landscaping profession, the aim of this study is to emphasize the importance of the profession of agronomist over the last century in urban plant production for increasing the quality of life, even though in the last 50 years there has been specialization of the profession in the agribusiness interest of grain production for export. Therefore, there is an urgent need for reflection on current academic training in this profession in the process of consulting services for landscaping and urban horticulture. In the south of Brazil, due to European origins, there is increasing real estate value of peri-urban areas and a consistent annual increase of 20% in the floriculture market. This visual product in urban landscaping is sketched out in agronomy through studies and extension projects in nurseries, gardens, squares and tree planting (urban and highway). Knowledge of botany and plant ecophysiology ally science and art with production of native flowers, medicinal plants, fruit-bearing plants and vegetable growing. From seedling production up to consumption or plant use in landscaping this chain has fulfilled many social functions, such as an increase in employment prospects, engagement in social and philanthropic type projects, and alternatives for occupational therapy with income and product generation. The aim of this study is to help current Brazilian agronomy rescue the origin of horticulture and integrate these new concepts.

Keywords: agronomist education, horticultural education, traditional horticulture, sustainable horticulture, development challenges

INTRODUCTION

In Brazil horticultural and landscape gardening projects are nowadays developed by multidisciplinary teams working together to maximize their effectiveness and minimize technical difficulties and short comings. There is no government regulation (specific legislation) concerning these projects. In general, the use of vegetable production and plant handling remains thus underestimated. Acknowledging the shortcomings in the horticulture area within the Agronomy School, two main questions arise: firstly, does the absence of horticulture science prevent the agronomists from specializing in landscaping and secondly, how can the lack of horticulture training be addressed in a systemic way?

Given the status of recent horticultural courses and the absence of the landscape designers in Brazil, agronomy courses seem to assist in urban agriculture and improving the quality of life in the last century. However, currently the main emphasis has been directed to large grain production scale (Furtado, 2002; Delgado, 2012). In parallel with this development, a marked decrease in horticulture education (departments and academic disciplines) is observed over the last thirty years. Despite this evolution, there is a movement in Brazil today to create public policy for landscape gardening in order to improve current social demands for quality of life for instance. Horticulture and landscape gardening can contribute to the democratization of the landscape competence in Brazil (Petry and Alves, 2014). Meanwhile, a few agronomists have remarkably succeeded to integrate horticulture and landscape design into agronomical practice, such as Hermes



Moreira de Souza and Harri Lorenzi (Lorenzi and de Souza, 2001), Mauro de Moraes Vitor (Victor, 2007), Otávio Augusto Teixeira Mendes (Mariano, 2005) and more recently Affonso Zuin (Zuin, 2002), Beatriz Fedrizzi (Fedrizzi, 1997, 2011), Toni Backes (Backes, 2012) and Julio Baréa Pastore (Reker and Pastore, 2013; Pastore, 2014). The horticulture and landscape gardening market is strong in the south of Brazil. This has been associated with European emigrants who settled in this part of Brazil. An annual floriculture market increase, approximating to 15% (floriculture, nursery production and landscaping) has been reported (BRAZIL, 2012).

Nevertheless, only through the resumption of the horticulture interdisciplinary character, it will be possible to introduce distinctive themes such as the production and use of native vegetable species, together with medicinal, aromatic and seasoning plants, flowers and fruits within the agronomy formation. Indeed, the agronomist assesses soil issues for vegetable production, in landscaping and urban horticulture. However, if the current Brazilian legislation of the Federal Council of Engineering and Agronomy (CONFEA, 1973) continues to attribute both parks and gardening roles to architects, the social roles of horticulture will be countless for three main reasons. Firstly, there is the increase in employment opportunities. Secondly, there is the engagement in greater projects of urban agriculture which has both a social and philanthropic dynamic. Thirdly, there is the application of occupational therapies with the creation of products. However, at the present time, this social role of horticulture is not perceived by most of the Brazilian intellectual elite, it will be a lost opportunity if nothing is done to reverse the course of the current decisions and of the public politics in favour of intensive agribusiness in large areas.

Therefore, there is an urgent need to rethink our current academic training in the agronomy profession and in particular to involve the landscape gardening and urban horticulture services. The aim of this paper is to highlight the importance and the impact that agronomy has made in urban plant production together with improving the quality of life; and to contextualize the horticulture training in Brazil demonstrating some possibilities of motivation and expansion of horticulture performance in the Brazilian Agronomy teaching.

MATERIAL AND METHODS

A literature review about the presence of horticulture topics in the curriculums of Agronomy Schools in Brazil was undertaken with a view to ascertaining the major problems and issues arising therein (BRAZIL, 2014). We researched the technical responsibility of horticulture in Federal Council of Engineering and Agronomy (CONFEA, 1973) and Ministry of Education (BRAZIL, 2006). The actual labor legislation on the horticulture profession in Brazil has been assigned by these two institutions. Upon finding out the existence of current Brazilian horticulture problems (and the elevated economic incentive for the agribusiness) in comparison with sustainable horticulture by pointing review of current Brazilian problems with intensive horticulture versus sustainable horticulture. We aimed to propose the reflection of a new view on this field as well as performance suggestions for the horticulture teaching in agronomy based on actual cases in the University of Passo Fundo, Brazil.

RESULTS AND DISCUSSION

Some key observations about Brazilian horticulture are presented below. The main findings on the Brazilian horticulture are: 1) a lack of tradition: Brazil is not a country in which most of the people recognize the horticulture heritage in their relation with nature; 2) agronomy focused on agribusiness on large surfaces: in the Brazilian Agronomy Schools, education is focused on large scale grain production for agribusiness and commodities. There are 263 courses in agronomy at Brazil. In about 20% of the best schools, the discipline of horticulture is mandatory (BRAZIL, 2014); 3) restriction of Brazilian Horticulture Society: the Brazilian Association of Horticulture (ABH) exclusively promotes vegetable crops in conferences with the exclusion of floriculture and other horticulture papers; 4) restriction of Horticulture profession: landscaping is not a registered profession in Brazil. However, there

is a legislation project (number 2043, 2011), to regulate this profession. The only Landscape gardening course is taught in the School of Fine Arts, in Rio de Janeiro. However, it does not offer courses of horticulture in the curriculum. In Brazil, there is the job description “Horticulture Technician” (Ministry of Education, Decree nº5.773/06); 5) horticulture within agronomy: horticulture is not a mandatory subject in the basic agronomy courses (Resolution nº 218, from 29.6.73) of Federal Council of Engineering and Agronomy (CONFEA) and in many schools it is not even offered as an option. Few schools have introduced horticulture as a mandatory subject due to the action of a local initiative, such as in the University of Passo Fundo. In most of the schools there are only optional subjects related to horticulture and medicinal plants (Lorenzi and Matos, 2008). Intensive commercial horticulture remains the core teaching focus in Brazil and the appreciation in horticulture of agro-ecological techniques and the introduction of sustainable landscape gardening is recent.

Brazilian popular and cultural tradition in horticulture

In general, there is no horticulture tradition in Brazil. Since the ‘discovery’ of Brazil (1500 AD), images of the settler’s hostile Nature have appeared. It shelters strange and wild inhabitants, the Indians. Their destruction is key to the success of the settlement and occupation project.

The colonization began with Portuguese, or prisoners who had come to Brazil, to the tropics, to escape a punishment, in hopes of becoming rich and maybe, in the future, return to Portugal. Other colonized countries presented another initial occupation, like the United States. There, most of the immigrants were fugitives from England and Europe because of religious issues. They intended to establish and start a new life. Those settlers had taken the horticulture tradition, from medieval monasteries and the ‘kleingarten’. Small pieces of land, improper for dwelling, where the main purpose is solely tilling the soil. A gesture of love and of life has linked to Nature. There is no nature despoilment. For example, the German approach of horticultural education was influenced by Humboldt (Bokelmann, 2007).

From the 19th century, with the arrival of the poor immigrants from northern Europe (Germans, Italians, etc.) in Brazil, the majority coming to establish in the south of Brazil, there was an attempt of resuming the life linked to nature and the gardens appeared (Petry, 2012).

However, in the vast Brazilian territory, with abundant forests, land and water, nature is still seen as gloomy and hostile. It becomes the landfill where hatred is cultivated and stored. In this scenario, the attention of Brazilians is focused on the glamour and city lights. In the new globalization, the capital and market prevail. The economic interest convinces us about the importance of km² of solid pave, rampant urbanization with no room for vegetation and water resources. Rivers are channelled, hidden (and forgotten) like our dead. It does not matter if it is a stream in Tapejara, Rio Grande do Sul (Martinello and Petry, 2013) or if it is the Tamanduateí River in São Paulo. There was no interest in keeping the historical memory of these rivers which were, respectively, the starting point and the way for occupation into the country. These two rivers are buried under avenues.

In south eastern Brazilian towns, like Bragança Paulista, men are ashamed of working on farms. They would rather earn little money, pay for transportation and work in the city. There is always the urban glamour that is emphasized and promoted by a media that is sponsored by the economic interest. There is an interest in workers and not in independent gardeners. There is no demand for horticulture, especially in these metropolitan urban areas.

The first garden club in Brazil, established in the late 1930s by English ladies in São Paulo, “The São Paulo Garden Club” is stagnant these days: it does not thrive due to a lack of members. Those ladies’ sons and daughters, grandsons and granddaughters no longer wish to know about garden culture and floriculture. They do not even have time for it in the urban life excitement that consumes every single leisure moment. Meanwhile, the landscaping architects keep on appreciating the broad paved spaces, surrounded by a decorative, nearly sculptural green, and confined to half a dozen vegetable species, commonly known and

offered by the market and far away from the so longed biological and ecological diversity.

Therefore, first and foremost, it is necessary to create a demand for the horticulture, make people aware of another possibility of reality, more adapted to nature itself, one that respects and reveres life (Kwack, 2007; Prain et al., 2007).

Agribusiness versus horticulture

Currently, the professional priority in Brazilian agronomy is agribusiness. Just like most of the Brazilian architects have allied with the opportunity of creating concrete and glass palaces in the big cities, agronomists have allied with the agribusiness, connected with the market, the capital and globalization. The big agribusiness multinational companies are funding several research projects in the Brazilian universities, like the High School of Agriculture Luis de Queiroz and the University of Passo Fundo. This is how the universal meaning that characterizes the university is eliminated. The undergraduate students are fascinated by the corporate salaries. There is multinational funding for parallel courses, PhD theses, all of which directed to the agribusiness. The professional associations like the Agronomists Association of São Paulo (AEASP) are also focused on agribusiness on large surfaces and the Institute of Engineering of São Paulo no longer has the Division of Agronomy, replaced by the Department of Agribusiness. There is no longer the idealism that was alive fifty years ago, when an agronomist would consider working at the “Casa da Lavoura” (Farming House) a noble goal. Agribusiness seems to provide greater opportunities for professional growth, greater financial gains, a false sense of security within this neoliberal model. There is a crisis in horticultural education reflected by the number of horticultural science departments at North American which has declined 35% over the last 30 years (Kim, 2007).

Horticulture favors the ongoing learning and entrepreneurship. It takes place within the family agriculture, where all the family members work in the production, management and sale. Even if the majority of the horticulturists from São Paulo have been facing many problems, there are very positive actual cases. For example, in the city of Campinas in the state of São Paulo, an experimental land reform has been established in the urban area, the horticulture has been practiced. Up to 2010, due to a farmers’ internal resolution, it remained untouched and resisted the propositions of the real state speculations. At Vale do Paraíba, rich lowlands are present, proper for rice paddies. They stretch for several kilometers, encircled by the urban expansion, but they are still protected from state speculation.

Regarding the Metropolitan Area of São Paulo (RMSP), it is the only one in the world which is located on the headwaters of sources (of the Rio Tietê). Several neighbouring cities united in a constant and inexorable expansion devour each square meter of the green area. Valley bottoms are substituted by avenues. Consequently, it imports water from a neighbour watershed which constitutes the so-called Cantareira System, it has from four to five vast dams until the Mantiqueira Sierra on the border of Minas Gerais state. Sadly, the city of São Paulo and its metropolitan area are bad examples of urban expansion: continuous solid floor, total disregard of hydrography, green areas and green belts meant for the agricultural production. The current lack of drinking water in the capital city has been drawn to attention.

Intensive commercial horticulture versus sustainable horticulture

Even if the agronomy school is the main responsible for the horticulture projects in Brazil, for there aren’t any horticulture schools (only courses in which the graduates have difficulties finding a job), there are problems caused by the use of improper technologies for the sustainable systemic productive process. For example, the Brazilian substrate legislation (decree 4.954, 14/01/2004) has withdrawn “mineral soil” as a conditioner, keeping imported turf (also an organo-mineral soil). For the seedlings used in landscaping (definite introduction in the territory), the use of local soil already in the substrate of the production recipient would benefit the survival and development of seedlings after the graft.

Personal observations by farmers and horticulturists relate negatively the use of

commercial substrates and high energetic input techniques with organic production techniques. For instance, bokashi fertilizer (a mix of inoculated soil microorganisms and brans) (J.-M. Veauvy, 2014, pers. commun.) and inoculation with mycorrhizal fungi damaged the early development of the plants. Apparently, these microorganisms stop being symbiotic and rival in these “great” production situations. These techniques will only be successfully applied if they are used in agroecological systems or organic production.

Since there is no longer soil to be used as substrate in pots, and in these, the substrate settled (recycled residues) the latter got more innocuous and stagnant than the soil. Consequently, the fertility of the substrate got completely dependent on the maintenance of the fertilizing handling. However, the indicated quantity is enormous. It is impossible to extend to the field the recommendation for pot fertilizing, for example, with salt sensitive plants (Penningsfeld, 1983). This recommendation is for 1 g of soluble chemical fertilizer per 1 L substrate. This measure, if calculated for ground cultivation in one ha (occupying a 20 cm depth) would require the use of 2.000 kg of soluble fertilizer ha⁻¹, which would make the field production of these varieties environmentally and economically impossible.

Models for thinking the soil handling and the agronomy teaching

New ways of thinking about the relations between the rural and urban areas are required. Nowadays in Brazil, the urban thinking prevails over the rural thinking. By the Federal Law, the municipal Power establishes the limits of the urban area and its expansion into the rural area. There is a financial interest in it, for the municipal government charges urban territorial taxes. Therefore, occupying the rural regions and promoting the real estate speculation generates income to the township. And the agricultural interests are not taken into consideration (the Vale do Paraíba in São Paulo), the hydrography preservation and the green areas. The urban expansion is interesting, the speculation is a general rule without planning.

We must pursue a new way of thinking and acting, a new and more balanced urban-rural relation, and take the society interests into consideration. What is the importance of both for the social man and the preservation of the environmental systems? Only Regional Master Plans in addition to the municipal ones can foresee these connections.

In the south of Brazil, there is still a strong family agriculture. The rural landscape of every property is embroidered with the agrarian trilogy (ager, silva, saltus) (Petry, 2012) and close to every beautiful house there is a kitchen garden, which is the rural garden. There are still places where the fair value of the rural man and his family is recognized. He still recognizes that his life there has a better quality than in the city. There is still time to recover the rural culture as opposed to the excess of the contemporary urbanism. In Europe, this rural production is celebrated through the tourism and products tasting. There is nothing to stop this from happening in the Brazilian rural area.

Agronomy teaching can make all of the above possible, upon working on the new professionals awareness (Table 1 and Figure 1). Van der Borg et al. (1995) proposes an evolution in terms of changing modes of knowledge delivery and teaching qualifications: student centred, discovery learning, self-regulative learning, external human resource input, high level cognitive learning and didactic counselling. In order to make all of this a reality, it must go back to its universal character; it must prepare citizens with a critical stance, prepared to work as change agents. Yet, it must be focused on the space knowledge, its occupation, preservation of ecosystems, cultural rural and urban landscapes. It must worry in an egalitarian way from micro to macro business, from horticulture to agribusiness, including the agricultural production in the rural communities and co-ops.

Still, teaching must assume the social and value the importance of the Land Reform in a continental and unequal country like Brazil. A Land Reform that cares about the rural area occupation, the creation of a culture and rural communities. It also must keep worrying about the urban agriculture and the green belts around the big cities (Prain et al., 2007). And, because it is a Biological Science, the agronomy teaching must be centered on the respect and nature revering: plants, animals and men. And, among so many technical rules, horticulture must be responsible for the recovery of the horticultural sense of every student.

For the botanist Luiz Emygidio (Lorenzi and Matos, 2008) is that feeling of those who can decode in plants their best way of expansion and cultivation. This must be taught and passed on. Education in horticulture is difficult and complex but it is the best long-term investment for sustainable development (Monteiro, 2007).

Table 1. Awareness activities undertaken in the School of Agronomy of the University of Passo Fundo, Brazil.

Awareness educational activities
Description of the existence of horticulturists in their region
Description of landscapes in their region
Creation of a protocol for non-conventional edible plants (PANCs) to awaken the horticultural sense
Describe the landscape of the university campus (sensitive analysis)
Gardening practice on the flower beds in front of the Agronomy School building (4-month duty to each students team)
Take a picture of their favorite landscape and set a sketch describing it with the main elements
Develop a landscaping project of an actual area with criteria of biodiversity appreciation and with water re-use elements (cistern), solar panel and organic residues recycling (composter)



Figure 1. a) Practical gardening class on the agronomy school flower beds; b) exercise of landscape sensitive analysis on the campus; c) bonsai practical class in the seedlings greenhouse; d) visit to an urban agroecological horticulturist (Passo Fundo, Brazil).

CONCLUSION

In this study we highlight that it is of great importance for agronomy to recognize and

value teaching in horticulture, but also in sustainable horticulture in the formation of young agronomists. This will facilitate evolution and changes of the legislation and prepare competent professionals in horticulture and landscape design and gardening, in Brazil.

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Literature cited

- Backes, T. (2012). Paisagismo para Celebrar a Vida: Jardins como Cura da Paisagem e das Pessoas (Paisagem do Sul, Porto Alegre).
- Bokelmann, W. (2007). The german approach of horticultural education. *Acta Hortic.* 762, 401–406 <http://dx.doi.org/10.17660/ActaHortic.2007.762.39>.
- BRAZIL. (2006). MEC. Ministry of Education and culture. Decreto nº 5.773/06. http://Downloads/catalogo_nacioanl_cursos_superiores_tecnologia_2010.pdf (Accessed on October 22, 2014).
- BRAZIL. (2012). Mercado brasileiro de flores crescerá 15% em relação ao ano passado. <http://www.brasil.gov.br/economia-e-emprego/2012/08/mercado-brasileiro-de-flores-deve-crescer-15-em-relacao-ao-ano-passado> (Accessed on October 23, 2014).
- BRAZIL. (2014). MEC. Ministry of education and culture. Cursos de agronomia no Brasil. <http://emec.mec.gov.br> (Accessed on October 24, 2014).
- CONFEA. (1973). Federal Council of Engineering and Agronomy. Resolução nº 218, de 29.6.73. <http://normativos.confesab.org.br/downloads/0218-73.pdf> (Accessed on October 22, 2014).
- Delgado, G.C. (2012). Do Capital Financeiro na Agricultura à Economia do Agronegócio: Mudanças Cíclicas em Meio Século: (1965-2012) (Brazil, Porto Alegre: Editora da UFRGS).
- Fedrizzi, B.M. (1997). Improving public schoolyards in Porto Alegre, Brasil. Ph.D. Thesis in Landscape Architecture (Alnarp, Sweden: Swedish University Of Agricultural Sciences).
- Fedrizzi, B.M. (2011). Improving Public Schoolyards in Porto Alegre, Brazil (Saarbrücken, Germany: Lambert Academic Publishing).
- Furtado, R. (2002). Agribusinees Brasileiro: a História (São Paulo, Brazil: Evoluir).
- Kim, B.D. (2007). Crisis and opportunity in horticultural education. *Acta Hortic.* 762, 31–42 <http://dx.doi.org/10.17660/ActaHortic.2007.762.3>.
- Kwack, B.H. (2007). The value of human life with horticultural practices and products. *Acta Hortic.* 762, 17–22 <http://dx.doi.org/10.17660/ActaHortic.2007.762.1>.
- Lorenzi, H., and de Souza, H.M. (2001). Plantas Ornamentais no Brasil: Arbustivas, Herbáceas e Trepadeiras (Nova Odessa, Brazil: Plantarum).
- Lorenzi, H., and Matos, F.J.A. (2008). Plantas Medicinais no Brasil. Nativas e Exóticas (Nova Odessa, Brazil: Instituto Plantarum).
- Mariano, C. (2005). Preservação e Paisagismo em São Paulo: Otávio Augusto Mendes Teixeira (São Paulo, Brazil: Annableme).
- Martinello, E., and Petry, C. (2013). Arroio Ibirapuitã: a paisagem esquecida. In Educação para o Cuidado: os Múltiplos Olhares da Educação Socioambiental, E.M. Foschiera, and C.D. Tedesco, eds. (Rio de Janeiro, Brazil: Multifoco).
- Monteiro, A.A. (2007). Education for sustainable horticulture. *Acta Hortic.* 762, 407–416 <http://dx.doi.org/10.17660/ActaHortic.2007.762.40>.
- Pastore, J.B. (2014). O Cerrado enquanto paisagem: a dinâmica da apropriação estética do território. Thesis in Architecture and Urbanism (São Paulo, Brazil: Universidade de São Paulo).
- Penningsfeld, F. (1983). Kultursubstrate für den gartenbau, besonders in Deutschland: ein kritischer überblick. *Plant Soil* 75 (3), 269–281 <http://dx.doi.org/10.1007/BF02369967>.
- Petry, C. (2012). Garden culture of the European immigrant and identity landscaping in the south of Brazil. *Acta Hortic.* 937, 1267–1274 <http://dx.doi.org/10.17660/ActaHortic.2012.937.157>.

Petry, C., and Alves, S.F.N.C. (2014). Les paysagistes au Brésil. In *Les Paysagistes dans le Monde*, P. Donadieu, ed., p. 50-54. http://topia.fr/images/documents/p.donadieu_les_paysagistes_dans_le_monde_mai_14_1_1_.pdf.

Prain, G., Arce, B., and Karanja, N. (2007). Horticulture in urban eco-systems. Some socio-economic and environmental lessons from studies in three developing regions. *Acta Hortic.* 762, 227-244 <http://dx.doi.org/10.17660/ActaHortic.2007.762.22>.

Reker, M., and Pastore, J.B. (2013). Uma intervenção paisagística no espaço urbano. In *Filosofia e Arquitetura da Paisagem: Intervenções*, Adriana Veríssimo Serrão, org. (Lisboa, Portugal).

Van der Borg, W., Bryden, J.M., and Fuller, A.M. (1995). Rethinking higher agricultural education in a time of globalization and rural restructuring. *J. Agric. Educ. Ext.* 2, 29-40.

Victor, M.A. de M. (2007). *Brasil: o Capital Natural* (Botucatu, Brazil: Fepaf).

Zuin, A.H. de L. (2002). *A conjoint study towards transformative landscape architectural education in Brazil*, Ph.D. Thesis in Landscape Architecture (Edinburgh, UK: Edinburgh College of Art, Heriot-Watt University).