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**USING OF INTEGRATED MANAGEMENT IN THE CONTROLLING OF THE GREEN
SPACE PESTS IN TEHRAN - REGION 4**

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ABSTRACT

Development of an integrated management program requires an exact knowledge of the ecosystem, its including components and their interactions. Due to a change in lifestyle, urbanization development, increasing of host plant species and changes that took place in population structure of different cities and also agricultural land use changes, all predisposition to the flooding situation in many pests insect that seems it is necessary to provide a fundamental frame of surveillance, prevention methods and fighting for pest control. To evaluate the use of integrated management in pest control of green spaces in Tehran, a study was conducted between 91-89 in district 4 of Tehran that elm leaf miner bee and elm leaf beetle have been identified as a common pests in the region.

The present study was a descriptive survey method and in terms of the data collection method, is a descriptive-survey research. The investigated society of the study consists of all managers and experts in municipal area of 4 in Tehran that they are 260 individuals and based on Morgan table, the sample size of 153 was obtained. In this study, were used of literature and library review, questionnaires and interviews with experts. In order to analysis data were used of the Kolmogorov-Smirnov test, Friedman ANOVA, Spearman correlation coefficient and regression analysis and also was used of software Spss 16 and Lisrel 8.5. It seems, according to the results of the questionnaire, using the integrated management in controlling of green space pests of

district 4 is less important than chemical methods. In Iran due to the better conclusion of the chemical method, has been used of Insecticide Imidacloprid (Confidor) and Fenvalrate (Sumicidin) to control pests. Also in prioritizing the first set of agronomic, biological and mechanical methods in an integrative way and using of chemical methods in the last class of priority may be more effective than the use of chemical methods alone.

**Keywords: Chemical methods, pest integrated management, elm leaf beetle, elm leaf miner
bee**

INTRODUCTION

In recent years, due to the development of urbanization, industrial development and modernization, enormous changes in population structure and different cities of the world were conducted that its obvious symbol was the formation of big cities, population growth, new and developmental technology application, which resulted to the instruction of the big cities. In these big cities due to population growth and different demands, significant changes were conducted in land use in a way that many of the gardens and agricultural lands changed their land use and the urban areas of these cities which providers of air conditioning system of these cities, found another use that sometimes they are pollutants as well. In three these changes, the great importance and role of green spaces got obvious and many other countries in order to fight pollution in metropolitan offered the green belt program ¹. Nowadays human in order to achieve the advanced civilization, by the destruction of forests,

pastures, trees so that to build large residential complexes, roads and highways, airports and broad trade centers and thus they directly have role in polluting the environment, especially air conditioning. The air pollution in addition to the cities, effects the agricultural areas too, for example monoxide carbon gas which is one of the most toxic air pollutants in cities, is dangerous for human, animals and plants health, that by burning of carbon materials and more by motor vehicles are released air. Other normal pollutants which are toxic to plants are including of: Ozone proxy acetyl nitrate under the shining of sun is turned into the released gases into the atmosphere and also sulfur dioxide occur which is made by burning fossil fuels.

To compensate for this loss in cities, developing green spaces and trees in environment can greatly affect. Because trees as the main factors of the environment conditioning, absorb carbon dioxide and

produce oxygen (through photosynthesis), absorption of nasty toxic gases, producing enjoyable smells and absorbing aerosols that stick to the fur of leaves, assist the air cleanliness. Besides these trees known as the main factors preventing noise pollution, especially as anti-voice around factories and high roads and they also have great role in preventing the soil washing and land erosion. Fortunately, in recent years, in Iran, municipalities have particular attention toward the contamination of the environment and the development of parks in urban and conference many green space particularly in Tehran in order to find a good way and fight against environmental pollution. Nowadays no one couldn't predict that technological advances to what extent can have an adverse effect on the environment or living organisms.

Excessive use of pesticides is one of the examples in the past half century has become as one of the major problems of pollution of flowing water, groundwater, soil, air and toxic agents in humans and animals (Kamal, 2001).

Pest integrated management is a management system with regard to economic, social production and farming system², environmental and population dynamics of the pest species population take all

appropriate techniques in such a way that the pest population level placed under the economic detriment level.

In this first definition of the pest refers to all alive damaging factors besides of birds, rodents, nematodes, insects and mites and fungi, viruses and bacteria and also in this definition is used of the word system in relation to pest management³.

Integrated pest management, in its turn is a sub-system⁴ of cropping system⁵. the reason which is more frequently emphasized in the definition of integrated pest management is the combination of methods to reduce the use of pesticides for the integration of different methods with each other is the most important work of understanding urban ecosystem and its including components as well as the understanding of the relationships and interactions between living and non-living factors in this recognition system that helps us fighting pests before attempting to start operations, help us to consider all the available features and tools for pest control, and more important than is taking that in to consideration in order to in integrating the methods, one method do not counteract the other affection or do not have the opposite effect on that (Flint and Van Den Bush, 1993). This study is important because it is provided the maintain of green space in the

way to help to fight against the pests and to prevent from the pests development and therefore, based on the attitude of the quality of life and the environmental management, it is necessary toward any factors that damage the conditions of green space and particularly any kinds of insects of comprehensive methods is established in an integrated approach in the fight against pests. With regard to the raised issues, this study seeks to answer these following questions: are pests in urban green spaces marked with seasonal changes? At the moment, are we using of various methods in order to control pest? Does toxins consumption have environmental effects in the urban environment? Is there any possibility of using the non-chemical methods of pest control? Is there any possibility to obtain a suitable model for application in integrated pest management programs for pest control?

RESEARCH METHODOLOGY

The aim of the research is to use the integrated management in the controlling of the green space pests in Tehran and this study is functional in terms of goal. According to the method, this research is descriptive and survey-oriented. Due to the method of data collection is based on field data. To collect the data was used from the questionnaires. The validity of the

questionnaire confirmed by the validity of the judgment that judgment validity of the questionnaire has been confirmed due to the research results and scientific papers in the world, as well as managers, experts in Tehran Municipality. The reliability of the questionnaire regarding the Alpha Cronbach is shown that it is not acceptable or sustainable in terms of reliability. Research questions of this thesis are as follows:

The first hypothesis, questions 1-7, the second hypothesis, questions 8-16, the third hypothesis, questions 17-23, the fourth hypothesis, questions 24-27, the fifth hypothesis, questions 28-35. About the scale should be said that the Likert scale is used that according to the aim of study, the questions in the form of options (from very low to very high degree of importance) are divided. The study consists of all managers and experts of Tehran Municipality 4 of which According to Morgan, there are about 260, and 153 samples respectively. The study of literature review, questionnaire and interviews with experts were used. For analysis were used of the analysis of the Kolmogorov-Smirnov test data, Friedman ANOVA, Spearman correlation coefficient and regression analysis and software SPSS 16 and LISREL 8.5.

FINDINGS

- **Investigations carried out at the regional level of 4**

In order to collect data in the context of using Integrated Management of Pest Control in green belt zone 4 were referred to the relevant institutions, including the following:

1. Municipal District 4
2. Parks and green spaces in Tehran
3. Training and Plants Consultancy Center in zone 3
4. Training and Plants Consultancy Center of Region 4

In referring to the parks and green spaces in the city of Tehran and personal interviews with experts and investigated surveys during the project as a single integrated management against eating elm bark beetles (*Scolytus multistriatus*) was due to financial problems and mismanagement was left unfinished. In referring to the 4 municipalities and interviews with experts in the field of education, one of the active centers are introduced and advice plants district 4, which is the municipal center. The results of correspondence and interviews with officials of the clinic are as follows:

1. Common plants used in the region include hardwoods, conifers and shrubs which can be noted, for example, elm, *Ulmus minor*), acacia,

Robinia pseudoacacia), sycamore, *Platanus*, Thorne, *ligustrum vulgare*)).

2. Among the most common pests in this region, elm leafminer beetle (*Galerucela luteola*), elm leafminer bee (*Fenusa ulmil*), are the most common respectively.
3. Possibly due to the biology of pests and beautiful eve were used of physical methods such as pruning and crop operations, including the strengthening of plants, remove weeds ...
4. The use of specific chemical compounds used in special level of pesticides such as used pest in the phase of Imidacloprid (*Confidor*) and Fenvalrate (*Sumicidin*).

Please note that the implementation of the integrated management of green spaces as documented, for reasons which will be addressed in this study has been performed.

- **Demographic Characteristics of the Respondents and the Population**

Based on the analysis of data, 103 of respondents were male and 51 were female. Also 57 of them are with 5-1 years of work experience, 74 of individuals are 6-10 years old, and 15 men are 11-15 years old and 6 women more than 15 years old. The results showed that 51 of the respondents

aged 18 to 30, 92 of them are, 31 and 40 years old, 8 individuals are 41 to 50 years old and 1 person is older than 50 years old. Also 23 of them are high school graduates, 35 individuals have associate degree, 77 have B.A. degree, 14 were M.A. and 2 individuals have doctoral degree.

- **Specific Data**

Distribution of respondents' opinions about each of the dimensions of the conceptual model (sub-items) distribution of respondents' opinions about the tangibility (Questions 1 to 7).

The results showed that the average (mean) response to seasonal changes (questions 1 to 7 scale) of 3.529032, the average (mean) for the different methods of pest control (questions 8 to 16 scale) of 3.5098, the average (mean) for use pesticides (Questions 17 to 23 questionnaire) to 3.57480, The average (mean) for the non-chemical methods (questions 24 to 27 questionnaire) and 3.32456 times the average (mean) for programs IPM (questions 28 to 35 questionnaire) is equal to 3.83233.

The Data Analytical Analyze Variable Factorial Analysis of Seasonal Changes

In the graph below, we showed variable dimensions model of seasonal changes in standard mode and significant. As this chart

shows, the membership of all the factors examined in this variable, but questions have been confirmed.

Factorial Analysis of Different Methods of Fighting Against Pests

The Figure 3 below, shows the various methods of fighting against pests in standard and significant mode. As this chart shows, the membership of all the factors examined in this variable has been confirmed.

Factorial Analysis of Toxins Consumption Variable

The Figure 6 below shows toxin consumption model in the standard and significant model. As this chart shows, the membership of all the factors examined in this variable has been confirmed.

Factorial Analysis

Factorial analysis of Non-Chemical Variable Methods

The Figure 7 below, shows the Non-chemical methods in significant and standard mode. As this chart shows, the membership of all the factors examined in this variable has been confirmed.

Factorial Analysis of the Integrated Pest Management Variable Programs

In the Figure 9 below we showed the management program of pest integrated model in standard and significant mode. As this chart shows, the membership of all the

factors examined in this variable has been confirmed.

Study of Variables Distribution Normality

Software SPSS according to the central limit theorem is diagnosed the results of this questionnaire normal, so the null hypothesis which means the normality of variables can be confirmed.

One-Sample T Test

In order to evaluate the situation of each of the effective dimensions in integrated management investigation in pest control of green space of Tehran green spaces, generally was used of one-sample T test. If we consider the number 3 in the 5-item range of Likret as an average, so if the mean of each one of the above dimension reach 3, it suggests that this dimension has suitable according to other dimensions in the population.

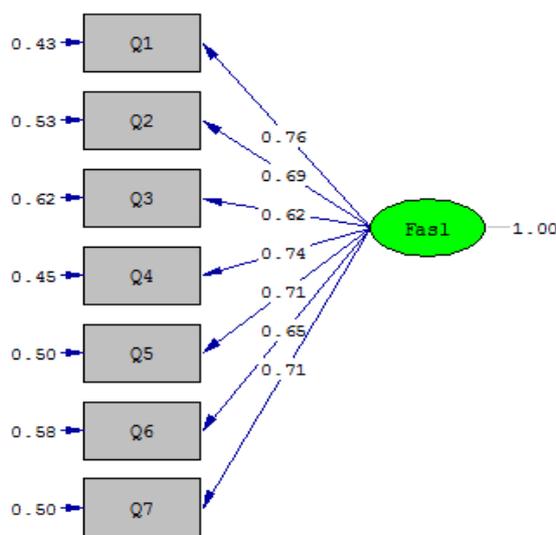
According to the table 2, since the probability is less than 0.05 in all dimensions, the observed T is greater than the critical t of 1.96. Therefore the obtained confidence interval in connection with this variables is not included zero.

In the significance level of 0.95, integrated management dimensions in Pests Control of green Space of Tehran have suitable and desirable levels in organizations. The average of over 3 is also suggest that.

Friedman Test (for the assessment of present situation)

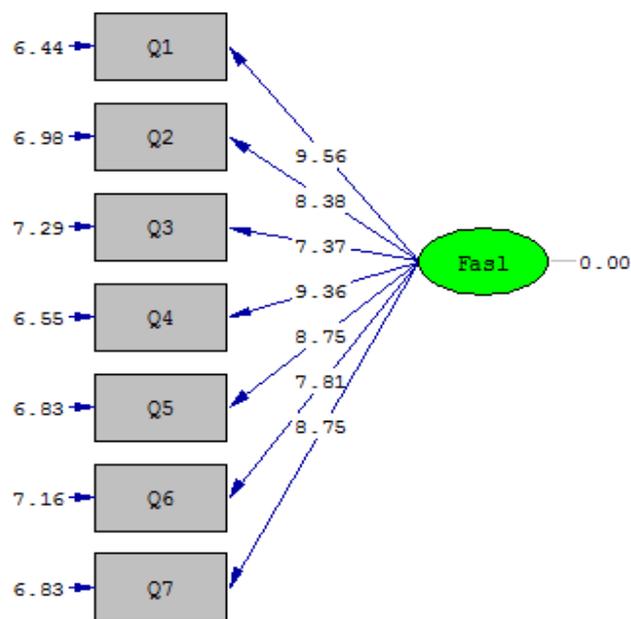
Friedman test also indicates the priority variables:

Friedman test showed that the priority criteria are respectively, seasonal changes, different methods for fighting against pests, pesticides consumption, IPM programs and non-chemical methods.



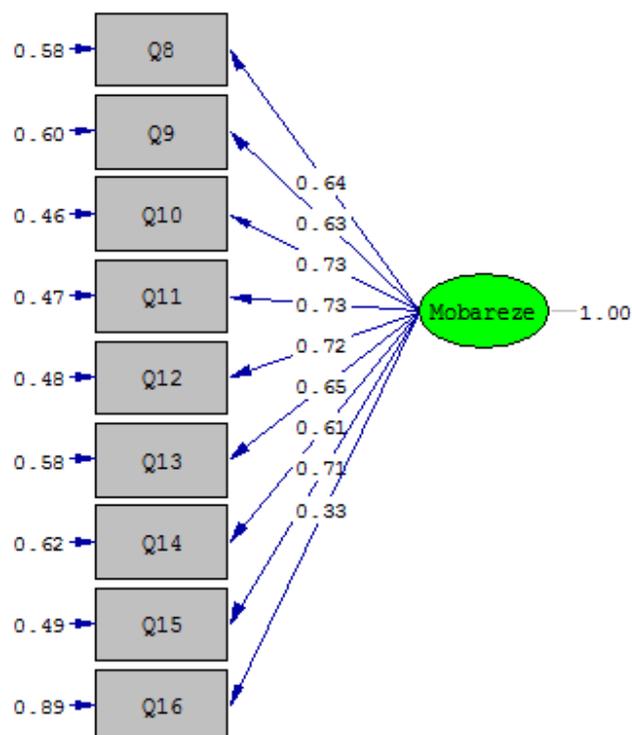
Chi-Square=62.63, df=44, P-value=0.00000, RMSEA=0.034

Figure 1 Dimensions measurement model of Seasonal Changes in Standard Mode by Using the Factorial Analyses



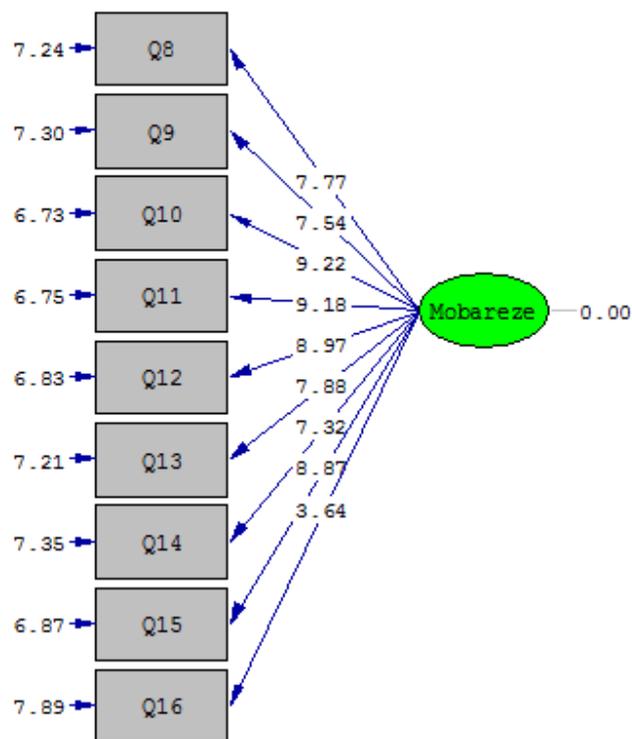
Chi-Square=62.63, df=44, P-value=0.00000, RMSEA=0.034

Figure 2: Dimensions measurement model of Seasonal Changes by Using the Factorial Analyses in Significant Mode



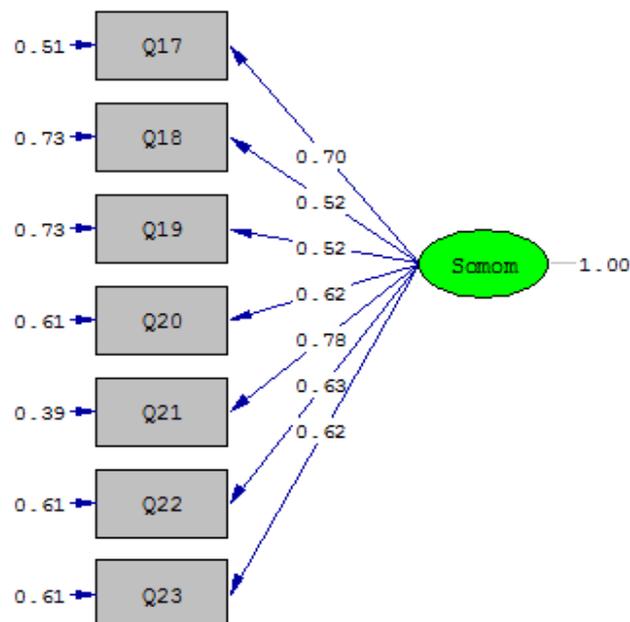
Chi-Square=80.51, df=47, P-value=0.00000, RMSEA=0.064

Figure 3: (b) Dimensions Measurement Model of Different Methods of Fighting against Pests by Using the Factorial Analysis in Standard Mode



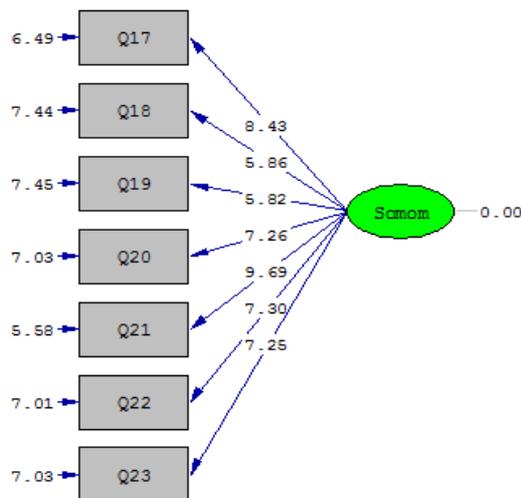
Chi-Square=80.51, df=47, P-value=0.00000, RMSEA=0.064

Figure 4: Dimensions Measurement Model of Different Methods of Fighting against Pests by Using the Factorial Analysis in Standard Mode of Different Methods of Fighting against Pests by Using the Factorial Analysis in Significant Mode



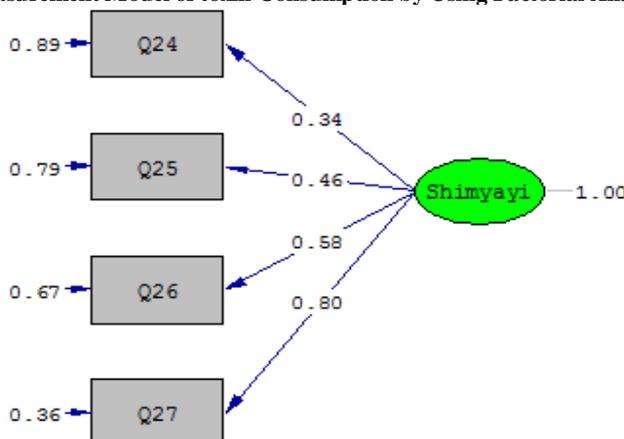
Chi-Square=30.76, df=14, P-value=0.00598, RMSEA=0.076

Figure 5, Dimensions Measurement Model of toxin Consumption by Using Factorial Analysis in Standard Mode



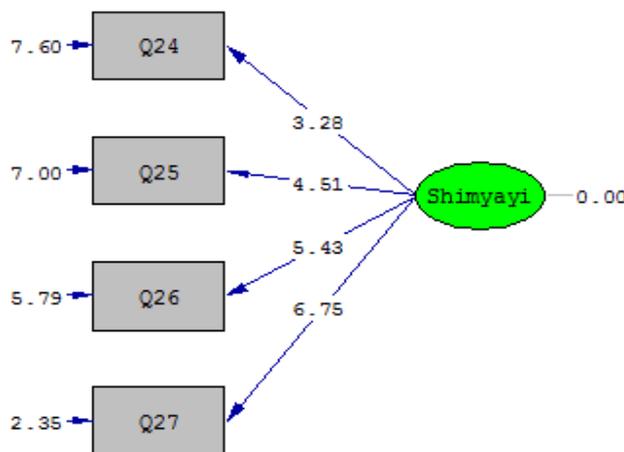
Chi-Square=30.76, df=14, P-value=0.00598, RMSEA=0.076

Figure 6, Dimensions Measurement Model of toxin Consumption by Using Factorial Analysis in Significant Mode



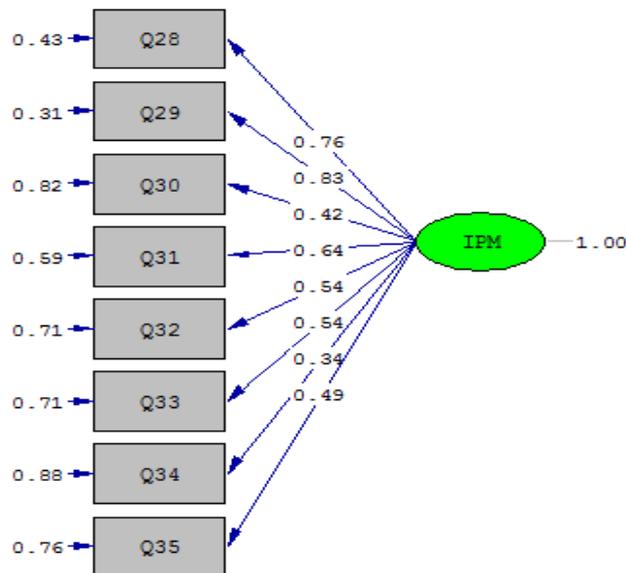
Chi-Square=8.00, df=6, P-value=0.01834, RMSEA=0.052

Figure 7: Dimensions Measurement Model of non-chemical methods by using the factorial analyze in standard mode



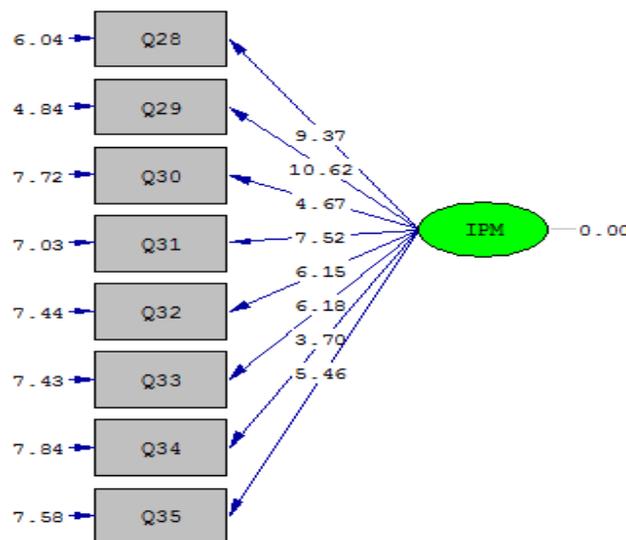
Chi-Square=8.00, df=6, P-value=0.01834, RMSEA=0.052

Figure 8: Dimensions Measurement Model of non-chemical methods by using the factorial analyze in a significant mode



Chi-Square=49.84, df=20, P-value=0.00023, RMSEA=0.108

Figure 9: Dimensions Measurement Model of integrated pest management programs by using factorial analysis in standard mode



Chi-Square=49.84, df=20, P-value=0.00023, RMSEA=0.108

Figure 10: Dimensions Measurement Model of integrated pest management programs by using factorial analysis in significant mode

Table 1 normal distribution of variables

	Kolmogorov-Smirnov	A significant amount
Seasonal changes	1.242	0.091
Different methods to fight against pests	1.102	0.176
Pesticides Consumption	0.868	0.439
Non-chemical Methods	1.115	0.166
IPM Programs	0.802	0.541

Test distribution is normal.

Table 2 Overall Results of T test

Variable	Count	The mean	SD	Statistics T	Significant level
Seasonal changes	152	3.53	0.07842	45.067	0.000
Various methods to fight against pests	152	3.42	0.07196	47.661	0.000
Pesticides consumption	152	3.39	0.06959	48.823	0.000
Non-chemical methods	152	3.30	0.06909	47.764	0.000
IPM Programs	152	3.33	0.06718	49.581	0.000

Table 3: Results of Friedman's Analysis

The test statistic	
Count	152
Chi-Square	32.327
Degree of freedom	4
Asymp. Sig.	0.000
a. Friedman Test	

Table 4: The Result of Friedman's Classification

	Mean Rank
Seasonal changes	3.61
Different methods for fighting against pests	3.07
Toxins Consumption	2.96
Non-chemical methods.	2.55
IPM Programs	2.82

DISCUSSION AND CONCLUSION

The present study by examining the data "using integrated management in controlling pests of urban green space" whilst providing notice of the status quo, make the way suitable to enhance and improve the knowledge in this context. Since the information about approaches and experts' point of view on the subject of research can help us to develop better at doing things, so after preparation and completion of questionnaires and observations, we should analyze them and in the next step we must deduce the results taken from them.

Distribution of respondents' opinions about each of the dimensions of the conceptual model are as follows:

Among respondents to the questionnaire, male, aged 31-40, degree level education is diploma and work experience of 6-10 years had the most abundant. The majority of respondents in relation to seasonal changes, the information about seasonal changes and pests life schedule of urban green space in integrated pest management programs have had a positive effect. About the different methods of struggling, the majority of responses indicated that the use of non-chemical methods and the positive effect of timely spraying of pesticides has reducing the consumption of pesticides and about the consumption of pesticides, most of the responses were about the negative effects of pesticides on air pollution. Relating to the

use of non-chemical methods, the majority of respondents evaluated the identifying biological agents in an effective pest management program and about the use of integrated management plans, most of respondents claim were toward the positive effect of the program and in order to reach the sustainable development.

The Results of Data Analytical Analyze

After a descriptive analysis of the data, the analytical data are going to be discussed. In the inferential analysis, testing hypotheses are evaluated. By using LISREL software, the relation between all variables and components in standard and significant mode were evaluated and the membership of all the factors in this variable were approved. Before we examine the relationships between variables, it is necessary to examine the normality of the variables. One method of investigating the claim for variables distribution normality is using the Kolmogorov-Smirnov test. Software Spss according to the central limit theorem is diagnosed normal the results of this questionnaire, so the null hypothesis which is normality of variables can be confirmed.

In order to investigate the situation of each one of the effective dimensions in evaluating the integrated management in pest control of green spaces in Tehran, in general was used

of one-sample T test that the integrated pest management dimensions of green spaces have been desirable in the organizations in which the mean over 3 is also suggest that.

At the end, Friedman test was used to assess the current status that the test results show that the order of criteria priority are respectively, seasonal changes, different methods to fight against pests, pesticides consumption, integrated pest management programs and non-chemical methods. The results of this test reflect the fact that the priority in pest control in the most situation is chemical methods and about the use of other methods, they should use it separately that the desired result which is in the integrative method wouldn't be made and conducted.

According to this research, the number of pests in green spaces, every year have flooding mode and cause lots of damage to plants and crops. For example, the elm leafminer beetle and, elm leafminer bee are presented as the key pests of green spaces in Tehran (zone 4).

Among the measures taken to control Elm Leaf Beetle in zone 4 can be noted to the use of farming methods including pruning and removal of dry branches of infected trees and also those chemical method using a systemic poison like Imidacloprid (Confidor) and Fenvalrate (Sumicidin).

Research of the University of California in USA in 2013 in this regard, was noted that the fight against this scourge must be integrated and using of different methods individually will not have any responds. One of those methods which are used in the controlling of pests is the farming method that includes the use of resistant varieties, to prevent damage to tree trunks and roots, continuing study of trees in order to remove the dry branches of trees, identifying the threshold beauty limitation which makes less use of pesticides and pest threshold and the calendar setting in order for investigating the pests seasonal changes that in controlling of this pest is very important.

Among other methods, the use of biological control is by using of parasitoids bees. Chemical control of these pests, including the use of bandages impregnated with pesticides and toxins injected into the damaged trees and spraying the leaves in spring, but it suggested that we should prevent from the chemical fighting for possible unforeseen effects of toxins such as contaminated water and the killing of the natural enemies of pests and the prevalence of secondary pests (Anonymous 2014).

Research conducted at Yale University in the United States represents that the use of integrated planting in farming controlling and

the use of pheromone traps are in biological control, which was mentioned at the University of California research (Anonymous 2014).

According to research done at the University of Washington, the only way to control the pests like elm leaf miner parasitoids, is the use of systemic pesticides (Anonymous 2014).

The other common pests of green space that is referred to it is elm leaf miner parasitoids in the region of 4 in Tehran is used to control it from the non-systemic poison of Fenvalrate (Sumicidin)

Among the measures that were used in the US in order to farming control of pest are including destroying the infected leaves and also using of resistant varieties and getting trees far away from being stressed, otherwise the attack chance increased. In biological control of these pests, was used of natural enemies and in chemical control was used of conventional pesticides, including Imidacloprid (Confidor), mineral oils and pesticides soaps (Anonymous 2014).

In Canada, in order to control the pest was used of the different methods. Can be named of removing and destroying the infected leaves and the use of systemic pesticides bands around the trunk. Among the issues which are important in the chemical control

of elm leaf miner parasitoids that the control of these pest due to its location in the middle of the leaves is difficult to be systematic, and also there is a tremendous emphasis on insecticide timing because by not observing the proper timing, chemical control will be ineffective (Anonymous 2014).

REFERENCES

1. Kamali, Karim. (2001). Integrated pest management in Tehran parks. Tehran research and educational seminars green space. Cover
2. Flyn Louise, Mary and Robert van den Bush. (1994). Cognitive integrated management Fat.trjmhy Chaichi cantaloupe. Tehran: Amidi.
3. Anonymous, 2014, University of Washington. *http://Www.washington.edu* (Accesses on: 22 December the 2013)
4. Anonymous, 2014, Yale sustainability. *http://Sustainability.yale.edu* (Accesses on: 22 December 2013)
5. Anonymous, 2014, university of California agriculture & natural resources. *http://Www.ipm.ucdavis.edu* (Accesses on: 15 December 2013)
6. Anonymous, 2014, Department of Environment and Conservation. *http://Env.gov.nl.ca*(Accesses on: 15 December in 2013)
7. Anonymous, 2014, Pacific Northwest Insect Management Hand Book. *http://Pnw handbook.org* (Accesses on: 15 December 2013)

¹ Green belt

² Farming system

³ Pest management

⁴ Sub- system

⁵ Cropping system