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# Changes in the power (Watts) of the actinic light do not affect its better performance vs the ultraviolet light

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**ABSTRACT**

Monitoring systems should be simple, time and cost effective, and collect as much information as possible, regarding the diversity of the communities under study. Most of studies use ultraviolet light traps to survey moths, although is known that the spectral sensitivity of moths has other wavelengths absorption peaks. As wider is the spectrum emitted by the lamps the wider is the fauna attracted and possible to be collected. The wider spectrum of actinic light, once it emits a large part of the ultraviolet wavelength as well as a peak at the blue, attracted more species than the ultraviolet light. In 2018 and 2019 the actinic light captured more species in 75% of the surveyed areas, while in 2020 in all areas. In 2018 and 2019, the power of the actinic light was 15 W and the ultraviolet light only 8 W. The actinic light trap captured, in 295 samples (50%), more species than the UV light trap which had a better performance in 201 samples (34%). In 2020 both light traps have the same power, 8 W, and results were similar, the actinic light collected more species in 123 samples (50%) than the ultraviolet light which in 48 samples (35%) collected more species than the actinic light.

***Keywords*:** actinic light, ultraviolet light, traps on insects

## 1. INTRODUCTION

Insects comprise a key component of terrestrial ecosystems and should be a major priority in conservation plans (Fisher 1998). Lepidoptera represents one of the most species rich groups

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of insects. The composition and abundance of the Lepidopteran fauna is dependent on the host plant for larvae, as well as on the resources (nectar), for the adult population, so the variety may be affected by the quality of plant communities (Fisher 2011, Curtis et al. 2015, Alison et al. 2017). Moths (Heterocera) inhabit almost all kind of habitats and so they play a very important role in ecosystems. Adult moths pollinate flowers, their larvae are mainly herbivorous affecting the growth of plants by reducing their photosynthetic area, as well as they are an important food resource for several species of birds, mammals and other insects. Macrolepidopteran moths have their ecology well registered, they are easy to identify and due to their easiness to attract and collect they are used in several ecological studies (Howell and Davis 1972, Holmes et al. 1979, Moulding and Madenjian 1979, Schowalter et al. 1986, Usher and Keiller 1998, Kronfeld-Schor and Dayan 1999, Hilt and Fiedler 2006, Dodd and Lacki 2007, , Gossner 2009, Schwenk et al. 2010, Ignatov et al. 2011, Malkiewicz 2012, Palting 2013, Grunsven et al. 2014, Macgregor et al. 2015).

Biodiversity is being lost quite rapidly on a global scale and evaluating species diversity becomes increasingly critical. Monetary limitations to conduct long time surveys are a concern to the realization of exhaustive inventories (Olivier and Beattie 1993, Lawton et al. 1998, Conrad et al. 2006). It has been suggested that sampling methods should be simple, time and cost effectives and, above all, effective to collect as much information as possible regarding the diversity of the communities under study. Light traps are considered as one of the best methods to survey moths, once they yield a large number of specimens with a minimum effort, they were used in several studies (Moulding and Madenjian 1979, Baker and Sadovy 1987, Coddington et al. 1991, Yela and Holyoak 1997, Jones and Eggleton 2000, Shuey et al. 2012, Horwarth et al. 2013, Molloy et al. 2013, Horwarth et al. 2016).

Although it has been documented that some families, such as Sphingidae, tend not to enter in traps in large numbers, that not all moth species have the tendency to fly into the light, that some species are predominantly diurnal while others seldom come to light, light traps are an accepted tool widely used in studies of moths' populations variety (Kolligs 2000, Summerville et al. 2002, Axmacher and Fiedler 2004, Beck and Linsenmair 2006, Frank 2006).

The inventory of moths is mainly conducted by using Heath traps with lamps emitting short wavelengths, like ultraviolet light (UV) (Thomas and Thomas 1994, Landau et al 1999, Summerville et al. 2003, Sayama et al. 2012, Infusino and Scalercio 2018). Photostatic species are easy to attract to UV light traps but as spectral sensitivity differs among species it has been reported that other light types, with different spectrums, show similar results to the UV's (Peitsch et al.1992, Hardie 1996, Cronin et al. 2000, Southwood and Henderson 2000, Fayle et al. 2007, Barghini and Souza de Medeiros 2012, Nowinszky et al. 2013). The spectral sensitivity in the eye receptors of most Lepidoptera species have peak absorption wavelengths of 350 (UV), 440 (blue) and 525 nm (green) (Briscoe and Chittka 2001, Johnsen et al. 2006, Brehm 2017).

Some studies have shown that as wider is the spectrum emitted by the lamps the higher is number of the fauna attracted to the traps being available to be collected. If a blue light peak is emitted, the sampling can be much more effective (Ashfaq et al. 2005, Fayle et al. 2007, Langevelde et al. 2011, Barghini and Medeiros 2012, Yang et al. 2014, Matos da Costa 2018, Komatsu et al. 2020). It has been proved, in mark recapture tests, that moths recapture rate decreases with an increment in the release distance from the light source (Baker and Sadovy 1978, Beck and Linsenmair 2006, Truxa and Fiedler 2012, Merckx et al. 2014).

The intensity of light used in sampling methods affects the number of moths which are attracted. Using more powerful lights can lead to a better prospection of communities, once the number of the attracted specimens increases and more species can be registered (Barghini and Medeiros 2012, Jonason et al. 2014, Matos da Costa 2018).

"Species richness", the total number of species present in a certain area, is one of the simplest ways to describe a moth's community, and it is demanded for the basic comparation when addressing the composition of communities among several sites (Cornell 1999). Species richness is almost impossible to be measured properly, once as more individuals are sampled more species will be recorded (Connor and Simberloff 1978). To overcome this issue, biodiversity indexes, such as the Shannon heterogeneity index, which provides a different approach to the measurement of biodiversity, once it takes into account not only species richness but also their evenness (Peet 1974, Magurran 1988, Heip 1998). Evenness describes how evenly the individuals are distributed among species, meaning their abundance in the whole sample. In all communities there are variations in the abundance of species, some are very common, higher number of individuals, while others can be very rare, few individuals (Magurran 1988, Gotelli and Colwell 2001).

The results obtained in the previous study (stage I), conducted at the Narew National Park (NPN) were produced using two different light spectrums traps: UV and Actinic light (ACT) (Matos da Costa 2018). The ACT light attracted more species and individuals than the UV, although these results could be influenced by the higher power of the ACT – 15W versus the 8W of the UV. According to various authors, monitoring programs should be designed after test trial experiences, as it is necessary to acquire data of high quality using efficient methods (Olivier and Beattie 1996, Basset et. al. 2004, Oliver and Huang 2006, Lovett et al. 2007, Rohr et. al. 2007, Malaque et al. 2009, Grunsven et al. 2014, Pickering et al. 2016).

This stage II study goes into this direction, once the ACT light seems to be more efficient than the UV and besides that allows to understand if the best performance of the ACT in the stage I study, was due to its higher power or if it was due to the emitted spectrum. In stage II both lights have the same power – 8W.

One of the main goals of these projects, stage I and II, conducted in the Narew National Park (NPN) forested areas is to design a cost effective Macrolepidopteran monitoring system for the Park.

## 2. MATERIALS AND METHODS

The protected forest areas where this project is being conducted are part of the Narew National Park which lies in the Upper Narew valley North-East Poland, in the Podlaskie Voivodeship. Marshlands and wasteland are the dominating ecosystems and cover about 90% of the Park area. In 2013, forests occupied 10% of the area of the Narew National Park (665 ha) mainly on swampy habitats (83%).

In 2017, the first year of this project, six areas were selected to conduct an inventory of the Macrolepidoptera fauna of the NPN forests (Matos da Costa 2018). In 2018 and 2019, the project was conducted in 11 new different areas, F18, F19 G18, H18, I18, J18, K18, L19, M19, N19, O19 and P19. Area F was maintained has a control area, once it had the highest number of species registered and 10 others were selected, five in 2018 and other five in 2019.

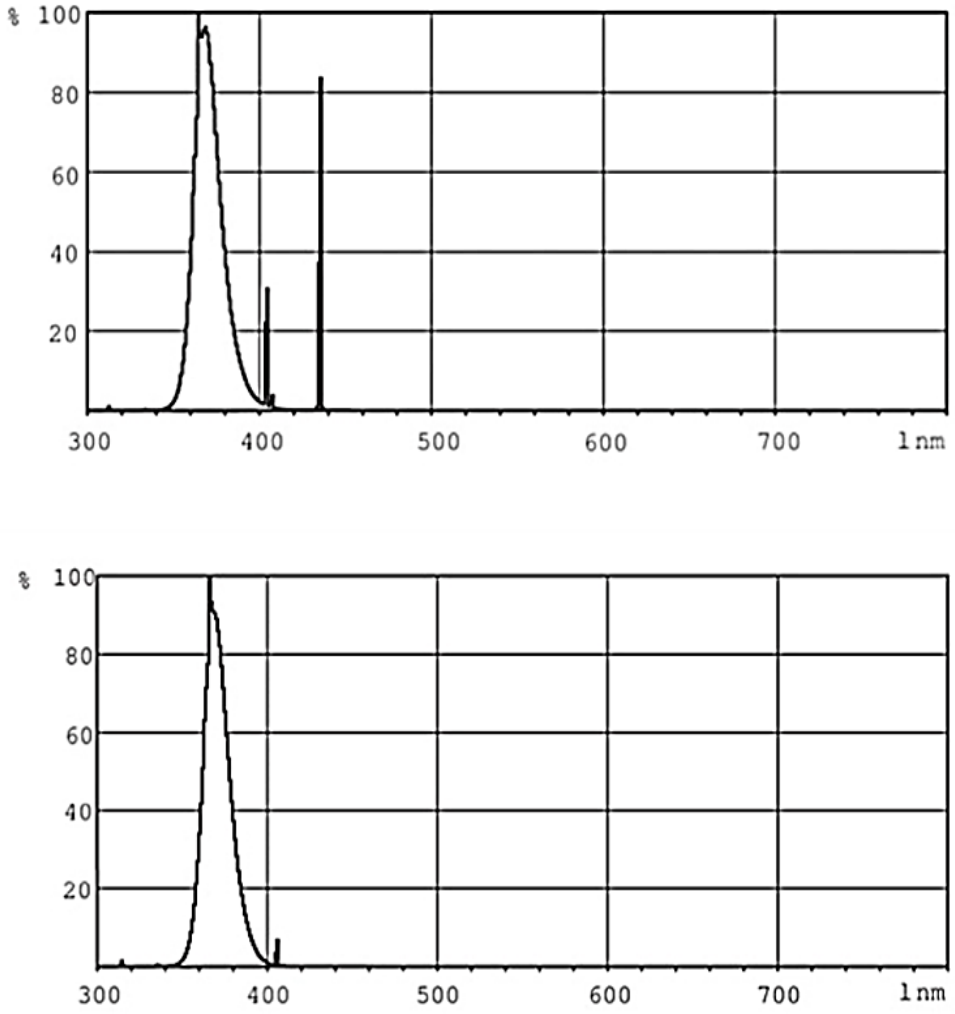


**Figure 1.** Light spectrum of ACT light (upper image) and of UV light (bottom image) (Philips 2017, Philips 2018) used in this project.

The Macrolepidoptera inventory was conducted simultaneously in each area for 24 nights, 12 in 2018 and 12 in 2019, in between the last quarter and the first quarter of the moon phases. In each area two Heath traps, one with an 8W ultraviolet (UV) light (Philips TL 8W BLB) and the other with a 15W actinic (ACT) lamp (Philips Actinic BL TLD 15W) positioned approximately 50 m apart. The spectrum of each light type is present in Figure 1. In 2020 the inventory was conducted in eight nights, in the areas F20, G20, H20, M20, O20, P20 which were selected due to their higher number of species and due to their localization throughout the Park. The same procedures as in 2018 and 2019 were used although both lights had the same intensity, 8W. Both traps were powered by a 12V 14 Ah batteries. The traps were positioned at the ground level and operated from dusk to down. The collected fauna was euthanized using ethyl acetate as a killing agent inside the traps and after it was sorted and stored frozen. Macroleptidoptera specimens were identified using wing pattern and stored in the NPN entomological collection.

The Pearson's correlation coefficient (R) was used to measure the strength and direction of the relationship between two variables. To test if there were statistically significant differences among groups the analysis of variance test (ANOVA) and the *t*-test were used with a 0.05 significant level of confidence ($p < 0.05$). To evaluate the biodiversity the Shannon index was used. The formula used for the calculation of these index was extracted from Magurran 1988 and it is the following:

$$H' = -\Sigma \, Pi \ln Pi$$

where: the quantity Pi is the proportion of individuals found in the 'i' species.

## 3. RESULTS

In 2018 and 2019 a total of 15394 of Macrolepidopteran individuals belonging to 10 families and 304 species were collected. Only data from the nights that both light traps worked properly is present in this study, so only 13718 individuals of 296 species, will be taken in consideration. The families that made up the majority of individuals (91%) and species (85%) of the total collected fauna were: Geometridae with 6668 individuals of 110 species; Erebidae with 3098 individuals of 39 species and Noctuidae with 2716 individuals of 102 species. In 2020 a total of 4484 of individuals belonging to 10 families and 192 species were collected. The families made up the majority of individuals (83%) and species (86%) of the total collected fauna were: Erebidae with 1664 individuals of 26 species, Geometridae with 1091 individuals of 71 species and Noctuidae with 959 individuals of 68 species. In 2018 (R=0.8632, p=0.0012), 2019 (R=0.9432, p=0.00004) and in 2020 (R=0.7261, p=0,0174) there is a strong correlation in between the captured number of individuals and species per family. The ANOVA test found no significant differences in the distribution of individuals per family among areas in all three years: 2018 – (F=0.816, df=5, p=0.54); 2019 – (F=0.2159, df=5. p=0.95) and 2010 – (F=0.456, df=5, p=0.80) as well as in the distribution of species per family among areas in all three years: 2018 – (F=0.175, df=5, p=0.97); 2019 – (F=0.113, df=5, p=0.99) and 2010 – (F=0.087, df=5, p=0.99).

The number of individuals and species collected by the ACT, by the UV and in total are present in Table 1. The number of individuals and species captured per family by the UV and the ACT light is highly correlated in all three years: 2018 – (R=0,9979, p=0,00001; R=0,9982, p=0,00001); 2019 – (R=0,989, p=0.00001; R=0,9873, p=0,00001) and 2020– (R=0,086, p=0,00001; R=0.9942, p=0,00001). The total number of species collected by these two light traps in each area per year is presented in table 2. The t-test only did not disclosed differences in the distribution of species or individuals among families captured by the UV light nor by the ACT light.

**Table 1.** The number of individuals and species collected by ACT, by UV and in total (T Spe – total number of species collected; UV Spe – total number of species collected by UV light; ACT Spe - total number of species collected by ACT light; T Ind - total number of individuals collected; Ind UV - total number of individuals collected by the UV light; Ind ACT - total number of individuals collected by the ACT light; Spe only UV - total number of species collected only by the UV light; Spe only UV - total number of species collected only by the UV

light; Spe only Act - total number of species collected only by the ACT light; Ind only UV - total number of individuals collected only by the UV light and Ind only ACT - total number of individuals collected only by the ACT light).

| | T Spe | UV Spe | ACT Spe | T Ind | Ind UV | Ind ACT | Spe only UV | Ind only UV | Spe only Act | Ind only ACT |
|---|---|---|---|---|---|---|---|---|---|---|
| 2018/19 | 296 | 269 | 267 | 13718 | 5882 | 7836 | 29 | 43 | 27 | 45 |
| 2020 | 192 | 157 | 168 | 4484 | 1496 | 2988 | 24 | 31 | 35 | 71 |

**Table 2.** Total number of species collected by these two light traps in each area per year (T - total number of species collected; UV - total number of species collected by UV and ACT - total number of species collected by ACT).

| | F18 | | | G18 | | | H18 | | | I18 | | | J18 | | | K18 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT |
| Species | 177 | 101 | 124 | 120 | 93 | 92 | 148 | 104 | 127 | 123 | 96 | 89 | 136 | 92 | 108 | 112 | 77 | 92 |
| | F19 | | | L19 | | | M19 | | | N19 | | | O19 | | | P19 | | |
| | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT |
| Species | 186 | 133 | 159 | 122 | 90 | 104 | 147 | 120 | 117 | 155 | 106 | 125 | 141 | 104 | 112 | 178 | 143 | 158 |
| | F20 | | | G20 | | | H20 | | | J20 | | | M20 | | | P20 | | |
| | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT | T | UV | ACT |
| Species | 98 | 57 | 83 | 104 | 72 | 87 | 117 | 81 | 93 | 103 | 73 | 83 | 94 | 66 | 71 | 122 | 69 | 103 |

The total number of possible samples, in 2018 and 2019, was of 2880, 24 sampling nights, 12 areas and 10 families (number of Macrolepidopteran families registered so far in the Park) and in 2020 was of 480, eight nights, six areas and 10 families. A positive sample is considered if both light traps collected individuals. Due to the fact that not all families were collected in all sampling nights, the samples in which no light trap collected any individual of a given family were erased. In 2018 and 2019, a total number of 586 positive samples was registered. The ACT light trap captured in 295 (50%) samples more species than the UV light trap, '>ACT'.

The UV light trap captured in 201 (34%) samples more species than the ACT light trap '>UV. In 90 (15%) samples the number of species caught by both light traps was equal. 'UV=ACT'. Similar results were independently registered in both years, in 2018: >ACT=51%; >UV=34% and UV=ACT=15% and in 2019: >ACT=50%; >UV=35% and UV=ACT=15%.

In 2020, the total number of positive samples was of 214 of which: >ACT=123 samples - 50%; >UV=48 samples - 35% and UV=ACT=22 samples - 15%. The number of positive samples registered per year and family are presented in Table 3.

**Table 3.** The number of positive samples registered per year and family (UV=ACT – number of samples where species caught by UV is equal to those captured by ACT; > UV – number of samples where species caught by UV is higher to those captured by the ACT, >ACT - number of samples where species caught by ACT is higher to those captured by UV, Total – total number of positive samples registered)

| | 2018 | | | | 2019 | | | | 2020 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Family | UV=ACT | >UV | >ACT | Total | UV=ACT | >UV | >ACT | Total | UV=ACT | >UV | >ACT | Total |
| Cossidae | 1 | 3 | 3 | 7 | 3 | 1 | 1 | 5 | 0 | 0 | 1 | 1 |
| Drepanidae | 5 | 12 | 17 | 34 | 4 | 10 | 13 | 27 | 6 | 2 | 10 | 18 |
| Erebidae | 7 | 20 | 30 | 57 | 5 | 15 | 23 | 43 | 6 | 4 | 19 | 29 |
| Geometridae | 9 | 19 | 36 | 64 | 1 | 22 | 25 | 48 | 6 | 18 | 24 | 48 |
| Hepialidae | 2 | 2 | 1 | 5 | 4 | 2 | 1 | 7 | 7 | 3 | 3 | 13 |
| Lasiocampidae | 9 | 7 | 9 | 25 | 8 | 7 | 6 | 21 | 8 | 6 | 8 | 22 |
| Noctuidae | 8 | 20 | 36 | 64 | 3 | 13 | 34 | 50 | 6 | 10 | 31 | 47 |
| Nolidae | 0 | 2 | 0 | 2 | 1 | 0 | 4 | 5 | 0 | 0 | 1 | 1 |
| Notodontidae | 3 | 16 | 19 | 38 | 7 | 10 | 15 | 32 | 2 | 3 | 13 | 18 |
| Sphingidae | 5 | 11 | 9 | 25 | 5 | 9 | 13 | 27 | 2 | 2 | 13 | 17 |
| Total | 49 | 112 | 160 | 321 | 89 | 135 | 265 | 265 | 43 | 48 | 123 | 214 |

The values obtained by the use of the H’ are present in Table 4 for 2018and 2019 and in Table 5 for 2020.

**Table 4.** H’ values obtained in 2018 and 2019 in each area by both light types and total.

| | F | G18 | H18 | I18 | J18 | K18 | L19 | M19 | N19 | O19 | P19 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T | 4,590 | 4,108 | 4,037 | 4,230 | 3,793 | 4,286 | 3,940 | 4,200 | 4,079 | 4,019 | 4,531 |
| UV | 4,399 | 4,051 | 3,862 | 4,105 | 3,591 | 3,956 | 3,714 | 4,184 | 3,724 | 4,068 | 4,428 |
| ACT | 4,636 | 3,898 | 4,035 | 3,954 | 3,714 | 4,168 | 3,907 | 4,025 | 4,123 | 3,754 | 4,417 |

**Table 5.** H' values obtained in 2020 in each area by both light types and total.

| | F20 | G20 | H20 | J20 | M20 | P20 |
|---|---|---|---|---|---|---|
| T | 3,967 | 3,52 | 3,951 | 3,178 | 3,796 | 3,983 |
| UV | 3,659 | 3,662 | 3,748 | 3,099 | 3,579 | 3,821 |
| ACT | 3,862 | 3,307 | 3,812 | 3,071 | 3,672 | 3,859 |

In 2018 and 2019, in six of 11 areas, the H' values werw higher for the ACT traps, in four areas greater for the UV traps and in the area P19 the values are almost identical. In 2020, in four of six areas the values are higher for the ACT traps, in one area, G20, the UV traps show higher values and in area J20 the indices have similar values. The area G, in 2018 and in 2020, showed a constancy of results, the H' value indicate higher values of biodiversity to the UV traps.

## 4. DISCUSSION

The dominant families, Noctuidae, Geometridae and Erebidae, registered in this study do not vary from the majority of Macroleptidopteran studies although its proportion varies among them (Summerville et al. 1999, Ludwig 2000, Summerville et al, 2002, Summerville and Crist 2005, Schmidt and Roland 2006, An and Choi 2013, Ober and Hayes 2010, Sayama et al. 2012, Joanson 2014, Tikoca et al. 2016, Matos da Costa 2018, Molina and Mare 2018).

It has been suggested, by Highland et al. 2013, that nocturnal moths do not perceive major distinctions between riparian forests and the evergreen gymnosperm ones that border them, this characteristic may explain the similarity of individuals and species per family distributions among these areas. It has been reported that a strong correlation between the number of species and the number of individuals, normally represent high diversity (Usher and Keiller 1998, Summerville et al. 2002, Summerville and Crist 2003, Shuey et al. 2012, Somers-Yeates et al. 2013, Horváth et al. 2016, Tikoga et al. 2017, Matos da Costa 2018) In other studies this correlation was not found (Horwath 2013 and Highland et al. 2013) and it was observed that riparian landscapes had moderate moth richness and abundant communities.

The ACT light has not been used in many inventories or monitoring activities. The UV lamps are more common in these studies (Thomas and Thomas 1994, Yela and Holyoak 1997, Usher and Keiller 1998, Summerville et al. 2003, Ober and Hayes 2010, Sayama et al. 2012, Shuey et al. 2012, Truxa and Fiedler 2012, An and Choi 2013, Horvath 2013, Grunsven et al. 2014, Merkcx and Slade 2014, Infusino et al. 2017, Infusino and Scalercio 2018, Matos da Costa 2018). UV lamps are preferred once they seem to be more effective than those which don't emit these lower wavelengths (UV) (Cowan and Gries 2009, Langevelde et al. 2011, Somers-Yeates et al. 2013) although Jonason et al. 2014 reported the opposite. Has shown in Fig. 1 the ACT emits a large part of the UV spectrum, as well as a peak of blue light (440 nm). Barghini and Medeiros (2012) demonstrated that insect attraction does not depend only on the UV present. For instance, it is known that Lepidopteran species appear to posses UV, blue and green receptors (Briscoe and Chittka 2001, Johnsen et al. 2006) which goes with the hypothesis

that different wavelengths of light will attract different number and variety of insects as proposed by White (1989).

Only few studies had demonstrated that the blue light peak is very effective in attracting insects (Ashfaq et al. 2005, Cowan and Gries 2009, Yang et al. 2013, Brehm 2017, Komatsu et al. 2020) which goes in the direction of the results obtained in this study: the ACT light catches more species than the UV light in 75% of the areas, in 2018 and 2019, and in all areas in 2020. The number of samples in which the ACT collected more species was clearly higher than the number of the UV samples, during each one of the three years of the study. In 2018 and 2019, the total number of species caught by the ACT was lower, 267, than those which were captured by the UV light, 269, as well as it was lower the number of species catch only by the ACT.

In 2020, the opposite was registered; the ACT caught more, and it was higher the number of species collected only by the ACT. These results can be explained by miss-registrations detected in both traps (data erased), in 2018 and 2019. Although it is known that species richness, and abundance is determined by the light source employed and so by its spectral composition (White 1989, Kolligs 2000, Fayle et al. 2007, Nowinszky et al. 2013, Jonason et al. 2014, Tykoca et al. 2016, Infusino et al. 2017, Matos da Costa 2018).

The number of species caught by both light traps was 240, although there were characteristic subsets of species caught independently by each light type. Summerville et al. 1999, realized that most probably non-phototactic species are underrepresented in their study once not all moth species are attracted to UV light. Fayle et al. 2007 stated that there is a possibility that moths most sensitive to visible wavelengths are not attracted to the UV traps and that certain wavelengths repel some species.

The power (watts) used by the lamps in light trap studies is normally described, going from 6 W to 40 W or from 125 W to 500 W. Different studies have shown that the performance of lamps with lower power had a better performance, a greater number of species and individuals collected, than those with higher power (Taylor and French 1974, Thomas and Thomas 1994, Beck and Linsenmair 2006, Fayle et al. 2007, Sayama et al. 2012, An and Choi 2013, Jonason et al. 2013, Infusino et al. 2017, Molina and Mare 2018).

In disagreement with this assertion, Jonason et al. (2013) explained that, the better results of the 250 W mercury lamp light vs the 40 W ultraviolet florescent tube, were due to the huge difference in power used by the light in both traps and Barghini and Medeiros (2012) collected more Lepidoptera species with light that used more power.

In this study, the number of samples in which the ACT light had better performance than the UV light did not decrease when its power decreased, which goes in the direction of Infusino et al. 2017, which showed that the quantity of radiation does not affect the number of moths caught. Fayle et al. 2007 used three different light spectrums to attract moths, the lamps used the same power, and species richness and Macrolepidopteran diversity are different among treatments.

In the present study the index of biodiversity shows different values for both light traps like it was reported by Fayle et al. 2007. These values can be higher for the UV traps even if the number of species, richness, collected by the ACT traps is higher.

These data are in agreement with several studies that demonstrated that different wavelengths attract a different variety of species (White 1989, Leionen et al. 1998, Summerville et al. 1999, Kolligs 2000, Fayle et al. 2007, Now inszky et al. 2013, Jonason et al. 2014, Tykoca et al. 2016, Infusino et al. 2017, Matos da Costa 2018).

## 5. CONCLUSIONS

The number of species captured by the ACT light was higher in 75% of the surveyed areas than those which have been collected by the UV light. These results are probably due to the fact that the ACT light, with its wider spectrum is able to collect more Macrolepidopteran fauna then the UV light. In according to this, the ACT light is able to give a better prospection of the fauna present in each sampled site and so it seems to be better to inventory and monitoring programs. It is anyway necessary to continue these studies once it is known and demonstrated here, that different light spectrums attract specific portions of the total fauna present in each area. The uniformization of the light power in both light traps to 8 W, in 2020, give us a better way to understand the relation in between the spectrum – power in the attraction of the moth fauna. Once the ACT light kept collecting more species, it is possible to conclude that the spectrum is more important than the power by itself. Biodiversity indexes are a very important tool to describe the varieties of communities among study areas although their performance in the evaluation of inventory/ monitoring techniques seems to fail once as much more species are collected better is the efficiency of a given technique.

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