

The practice of spider-wrestling in Northern Mindanao, Philippines: its implications to spider diversity

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Abstract. Spiders that are used as game or wrestling animals in the Philippines are called derby spiders. This study describes the details of spider wrestling sport in Northern Mindanao through profiling of gamer-respondents and constructing age structures of species commonly used in spider wrestling. Results showed that the higher the income of gamer-respondents, the bigger is the bet placed. Gamer-respondents have certain practices to prepare spiders for the game. Ten species of spiders from family Araneidae were identified to be used in the spider wrestling sport. *Neoscona vigilans* (60.19%) and *Neoscona punctigera* (32.87%) were the most commonly used species for spider fighting in all areas sampled. Only female spiders, mostly mature females of reproductive age, are used as derby spiders. The population of the most common derby spiders appears to be declining based on the constructed age structure.

Key Words: age structure, Araneidae, derby spiders, *Neoscona*, population.

Introduction. Spiders are invertebrates belonging to class Arachnida and occur almost in every habitat. Arachnids constitute the second largest class representing 7% of total documented arthropods and it is estimated that 8.3% of arthropods are arachnids (Arunkumar & Jayaprakash 2014). Order Araneae includes 110 families of 3,849 genera and 42,473 species (Sharma et al 2013). This is a group of highly diversified organisms with the world's third largest count of species (Platnick 2013). Spiders are generalist predators and have the world's most abundant taxon – Insecta – as their prime food (Maloney et al 2003). They can be found in almost all terrestrial habitats in natural settings, in fact, they can be found in most anthropogenic habitats (Wise 1993).

According to the study of Chetia & Kalita (2012), spiders are important but poorly-studied group of arthropods that play a significant role in the regulation of insect pests and other invertebrate populations in most ecosystems. Many species of spiders are good indicators of environmental health and they are sensitive to habitat loss, climatic change, and environmental upheavals. Despite their abundance, ecological importance, and ubiquitous occurrences, spiders are seldom included among organisms surveyed for extensive studies and conservation (Hippargi et al 2011).

Spider wrestling is not exclusive to the Philippines for there is a long tradition of spider wrestling in Kajiki, Japan (Matejowsky 2003). In the Philippines, a particular group of spiders is fondly collected by children and used as game animals, and these are called derby spiders (Barrion-Dupo 2008). Some concerns have been raised about the sport's impact on the educational and moral development of its participants, not to mention its effect on the environment (Matejowsky 2003), and not everyone is pleased with the spider wrestling sport (Moore 2013).

Due to unsustainable human activities, the ecosystem of spiders is under high risk of destruction. In this regard, it is essential to improve upon the knowledge on biodiversity to develop proper conservation strategies and monitoring systems. An action

strategy implemented for environmental conservation involves surveys for monitoring systems (Chetia & Kalita 2012). Since no extensive studies on spider wrestling in this region have been done, these animals remain unprotected.

Spiders were studied by Cabili & Nuñez (2014), Enriquez & Nuñez (2014), Garciano et al (2014) and Dacanay et al (2014) in different habitats in Mindanao. However, studies related to spider fighting in the Philippines and particularly in Mindanao are wanting. Thus, there is a need for research documenting the present status of this sport in the country as well as its effect on the population of spiders used for sport. As such, the results of this study hope to contribute towards identifying threats to the survival of these spiders and aid in the formulation of protection schemes for these species.

This study aims to describe the details of the sport of spider wrestling in the selected areas of Northern Mindanao, Philippines by profiling the “gamers” and their practices, identifying the spiders used for spider wrestling in selected areas in Northern Mindanao, and constructing an age structure for the most common species of spiders.

Material and Method. The study was conducted in the selected areas in Northern Mindanao which include the five provinces of the region, namely: Misamis Occidental (08°33'N, 123°70'E), Lanao del Norte (08°03'N, 124°00'E), Misamis Oriental (08°45'N, 125°00'E), Camiguin (09°17'N, 124°72'E), and Bukidnon (07°92'N, 125°08'E). This region occupies the North-Central part of the Mindanao Island. It is bounded by the Mindanao Sea on the north, Western Mindanao on the west, Caraga Region on the east and Regions 11 and 12 on the South (CountryStat Philippines 2014).

Northern Mindanao has a total land area of 1,714,803 hectares, of which 897,134 hectares are established as forestland and 817,669 hectares are alienable and disposable lands (DENR 2015). Per 2011 Philippine Forestry Statistics, the region has a total forest cover of 337,493 hectares, distributed as follows: Misamis Occidental with 43,880 hectares; Lanao del Norte with 68,625; Misamis Oriental with 45,026; Camiguin with 7,367; and Bukidnon with 172,595 hectares of existing forests.

This study was specifically conducted in three areas per province: Bonifacio (08°10'N, 123°60'E), Tangub (08°04'N, 123°45'E), and Oroquieta (08°29'N, 123°48'E) of the province of Misamis Occidental; Iligan (08°23'N, 124°25'E), Tubod (08°05'N, 123°79'E), and Kauswagan (08°19'N, 124°09'E) of the province of Lanao del Norte; El Salvador (08°57'N, 124°52'E), Gitagum (08°60'N, 124°40'E), and Medina (08°91'N, 125°02'E) of Misamis Oriental; Mambajao (09°25'N, 124°72'E), Mahinog (09°15'N, 124°78'E), and Sagay (09°12'N, 124°72'E) of the province of Camiguin; and, Malaybalay (08°09'N, 125°08'E), Baungon (08°25'N, 124°72'E), and Kibawe (07°57'N, 124°98'E) of the province of Bukidnon. The study areas were randomly selected.

One-on-one interview with the respondents using a survey questionnaire (Annex 1) was conducted from December 2014 to February 2015 in all provinces. Interview questionnaire was designed for collecting information on species of spiders used, collection sites, and information regarding the spider wrestling game. It also includes the profile of the respondents and their purpose of playing the game. This method was purposely done in order for the respondents to express freely their answers on the questions. The data were self-reported by the respondents.

Courtesy call was done first to the chairman of the barangays to let them know about the study. Study areas per province were randomly chosen. Three hundred respondents were interviewed during the conduct of the study. Sixty respondents were selected in each province. The respondents were those who are involved in the game or sport. They were informed first about the objective of the study before proceeding with the interview. The interview was conducted in Cebuano which is the local dialect in the area. The completed questionnaires were checked, coded, and stored for data entry. The data were then entered in Microsoft Excel and subjected to data analysis.

Data were analyzed using the PAST software ver.2.17c. Frequency distribution and percentage were done for data analysis from survey data. Correlation analysis was also performed to know the relationship between income status of the respondents and the

bet for the spider wrestling sport. Thematic analysis was done to cluster repeating themes in the answers of the respondents and to know the qualities of spiders that usually win the games. This illustrates which themes are important in the description of the phenomenon under study (Joffe 2012).

For further scientific identification, derby spiders from the gamers were collected. Samples were placed in large containers and pictures of live specimens were then taken. Specimens were preserved in 70% ethanol solution in glass vials labeled with date of collection for later identification. All specimens were identified by the second author at the Museum of Natural History, University of the Philippines Los Baños. The spider specimens were examined under a microscope to know which age class they belong, either immature, sub-adult or mature species for female spiders. This information was used for the construction of the age structure of the most common species used for wrestling.

Results and Discussion. In this study, there were 300 gamer-respondents, 60 from each of the five provinces. All of the respondents are males. The age of the respondents ranged from 5 to 58 years old (Figure 1). Most of them belong to age group 11 to 20 years old (38.67%). The youngest age range of the respondents was within 5 to 10 years old (10.67%) while the oldest was from 31 years old and above (22.0%). Most of the young respondents were from Camiguin (28.33%) and most of the older respondents were from Bukidnon (46.67%). Schoolboys are not the only ones involved in the sport. Young men in their late teens and early 20's whose jobs entail long periods of downtime, and security guards, vendors, and motorcycle drivers participate in spider wrestling to some degree (Matejowsky 2003).

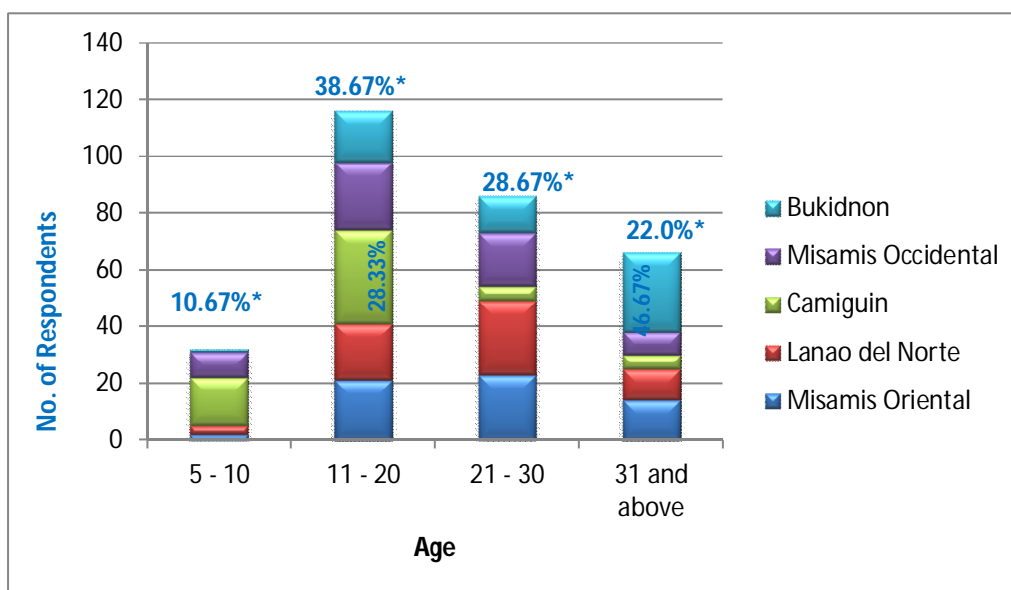


Figure 1. Age profile of the respondents. The number of respondents refers to the no. of respondents belonging to a particular age group; color indicates the province where respondents come from (* means total percentage per age range).

On the other hand, the data on the employment status of the respondents revealed a significant difference in all provinces (Figure 2). Almost half of the gamer-respondents were students (147 respondents or 49.0%), 117 were employed respondents (39.0%), while only 36 respondents (12.0%) were unemployed.

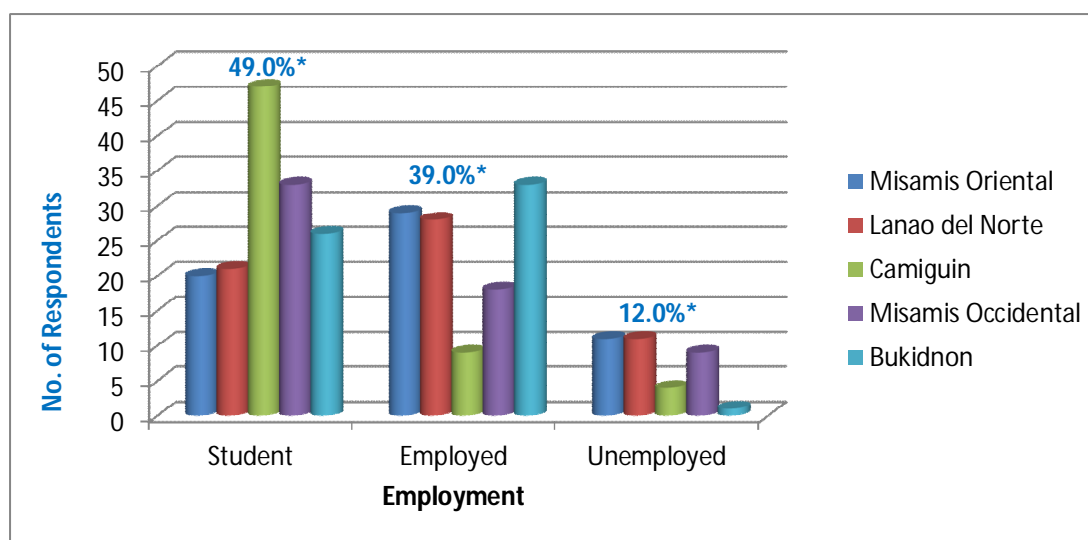


Figure 2. Employment status of the respondents (* refers to total percentage for all provinces).

Based on the survey conducted, gamers assigned different common names for these spiders. In Misamis Oriental, Camiguin, and some areas in Bukidnon, spiders are called "damang"; "lawa" in Lanao del Norte and Misamis Occidental while the most commonly used term in Bukidnon is "arawan". Each surveyed area has different local names for each species of these derby spiders (Table 1). One species of spider has a lot of local names because the gamers thought it was of a different kind. They reported that local names of these spiders were derived from the plants where they were captured and where they inhabit.

Table 1
Common name and local names of each species in all areas surveyed

Scientific name	Common name	Local name
<i>Cyrtophora parangexanthematica</i> (Barrion & Litsinger, 1995)	Tentweb weaver	Dark knight; Black king
<i>Eriovixia laglaizei</i> (Simon, 1877)	Laglaise garden spider	Taga-mais; Taga-saging; Fighter
<i>Neoscona facundoi</i> (Barrion-Dupo, 2008)	Orb-weaver	Marka-uno; Diyabti; Number 1
<i>Neoscona nautica</i> (L. Koch, 1875)	Brown sailor spider	Marka-espada; Fighting bangkaw
<i>Neoscona punctigera</i> (Doleschall, 1857)	Ghost spider	Aguyangyang; Taga-hagonoy; 1-2-3; Damang sa kuryente; Yens
<i>Neoscona</i> sp.	Orb-weaver	Taga-bayabas
<i>Neoscona theisi</i> (Walckenaer, 1841)	Common web-spider	Marka-krus; Krusan
<i>Neoscona vigilans</i> (Blackwall, 1865)	Brown-legged spider	Tiger-tiger; Damang sa bato; Damang sa kuryente; Taga-tabako
<i>Poltys illepidus</i> (Barrion & Litsinger, 1995)	Tree stump orb weaver	Trabungko; Camel
<i>Poltys</i> sp.	Orb-weaver	Trabungko; Camel

Of the 300 respondents in all areas surveyed, 76.0% answered that most of the derby spiders are habitually captured in grasslands like cogon grass (*Imperata cylindrica* L.) where spiders are usually bigger (Table 2). Derby spiders were also seen on plants like the devil weed (*Chromolaena odorata* L. R. M. King and H. Robins), wild sage (*Lantana camara* L.), coffee (*Coffea* sp. L.), and tobacco (*Nicotiana tabacum* L.). Others were

captured on bananas (*Musa* sp. L.), guava (*Psidium guajava* L.), jackfruit (*Artocarpus heterophyllus* Lam.), mango (*Mangifera indica* L.), horseradish (*Moringa oleifera* Lam.), cotton (*Gossypium hirsutum* L.), ipil-ipil (*Leucaena leucocephala* Lam.), calamondin (*Citrofortunella microcarpa* Bunge), cottonfruit (*Sandoricum koetjape* Burm.f. Merr.), water apple fruit (*Syzygium aqueum* Burm.f. Alston), mahogany (*Swietenia macrophylla* King), beechwood (*Gmelina arborea* Roxb.) and also on dead plants. Some of them can be found on rocks (7.33%). There were also derby spiders caught in cornfields (10.33%). Only 6.33% of the respondents said that derby spiders can also be caught in electric cables but then spiders were rarely seen in this location. Respondents stated that spiders caught in electric cables are aggressive and usually win the fight. These species include *N. punctigera* and *N. vigilans*. However, not all individuals of these species inhabit the electric cables. Most of them were captured in trees and grasslands.

Table 2

Time and place of collection of spiders by the gamers/peddlers

<i>Time of day</i>	<i>Frequency (N)</i>	<i>Percent (%)</i>	<i>Habitat</i>	<i>Frequency (N)</i>	<i>Percent (%)</i>
6:00-11:00 hours	28	9.33	grasses, plants, or trees	228	76.0
12:00-17:00 hours	29	9.67	electric cables	19	6.33
18:00-23:00 hours	204	68.0	rocks	22	7.33
12:00-5:00 hours	29	9.67	cornfields	31	10.33
Time not recorded since spiders are just bought from peddlers	10	3.33			

The spider wrestling sport is seasonal. It does not occur year round (Matejowsky 2003). It depends on the time of the year where derby spiders are abundant in the field. Most of the respondents (68.0%) answered that species of spiders for fighting are easily captured in the evening from 18:00 hours to 23:00 hours. This is because spiders construct their webs during this time at night, thus, there is no need to flip each leaf to find a spider. The student respondents collect spiders in the morning at 6:00 hours to 11:00 hours and in the afternoon at 12:00 hours to 17:00 hours because their parents would not let them go to the field in the evening. However, this takes place only when there are no classes. Some of the respondents (9.67%) collect their specimens before the sun rises. Ten of the respondents (3.33%) would not go to the field to collect their derby spiders. They just buy the spiders from the spider peddlers or from their co-gamers. They select the most aggressive species for them to train using their own method before they let the spider join in any spider fighting game.

According to the respondents, the more aggressive spiders are those trained for a week before setting them into a fight, and depending on how they are taken cared of. Others stated that the black and brown-colored spiders are the strong ones. One respondent in Bukidnon reported that the spider is more aggressive if it is already mature, and it also depends on what species the spider is and if the head part is already shiny, and if it has long and strong legs, and hairy body part which is the same with the description of Matejowsky (2003) for the best fighters. It also depends on where it was found and the kind of web that it has built. Spiders found in trees are more aggressive than those found in grasses. But the spiders in grasses are bigger in size. Spiders found in quiet places are more aggressive than those found in disturbed areas. Student respondents have this practice of not letting the spiders eat for 2 to 3 days after being captured and before letting the spiders join the game because this way, the spiders become more aggressive.

When asked if the respondents will collect the entire derby spiders encountered, others reported that they will only collect the bigger ones because the smaller individuals cannot be used. They will not capture the small spiders because they would not fight yet. According to some respondents, all of the derby spiders are collected then they select the

best or the stronger ones by putting them in a glass and letting them fight with one another. Those spiders not selected are returned to their habitat while others are fed to the chosen spiders.

Most of the gamers especially the students store their spiders in an empty matchbox. Some stated that storage for spiders must be spacious so the spiders feel comfortable. They also use medicine containers, box of cards, banana leaf stalk, boxes, and cartridge as storage materials (Figure 3). Others store eight spiders in a single box because they believe this is lucky. Few respondents from Bukidnon also reported that after buying a spider, it is placed in a square cage with a net and with a little branch of citrus plant in it so that the spider will be accustomed to make its web.



Figure 3. Storage materials for derby spiders.

The gamers also give some vitamins or supplements to their spiders while training them to boost their skill and become more aggressive. In Misamis Occidental, these so-called vitamins include milk, honey, water and dextrose. In Lanao del Norte, gamers use honey, coconut water, milk as energy booster, dextrose, and mother's milk. In Misamis Oriental, they use dextrose, coconut water, duck egg soup, Jujube plum fruit (*Ziziphus jujuba* Linn.), milk, honey, coconut meat, energy drink, and mother's milk. In Camiguin, they only use dextrose for their spiders. In Bukidnon, the gamer-respondents use milk, dextrose powder in water, dextrose, carabao grass extract, water, leaves of horseradish (*Moringa oleifera*), and Tiki-tiki syrup (vitamin for babies). The gamers put these vitamins or supplements in cotton balls and then place them in boxes or storage where the spiders are.

The gamers have several practices to prepare their spiders first before the game so that they can produce the best fighters. Some will let the spider rest for a week and expose their spider to the heat of the sun a day before the fight. Some of the gamers prefer restricting a spider's intake entirely (Matejowsky 2003) and do the 1-2 days or the 3-days fasting for the spiders before the game for them to become aggressive. They also let their spiders fight for 3 to 5 seconds before the game. Some will feed their derby spiders everyday even before the fight. A respondent also stated that after collection of the spider, it will take 2 to 3 months before it will be ready for a fight. The spider is stored in a box and every morning it is fed with dextrose powder with water while letting it go outside the box to do regular sparring sessions. This practice not only helps retain the natural agility of spiders but is also useful in familiarizing them with the fighting stick (Matejowsky 2003). The food items for these derby spiders include smaller/weaker spiders, insects, grasses, and leaves of horseradish (*Moringa oleifera*).

According to the gamers, spiders need to be trained before the fight to be the best fighter. Two spiders will be put in a bottle for them to practice fighting. They need exercise in the form of fighting with another spider. During the training, the spider will be

placed in a stick with a dead spider at the other end. The spider will eat the dead spider, however, before it will be done eating the dead spider, it should be taken from the stick. This will provoke the spider to bite because it was not yet done eating. Again, the spider is put out to walk on the stick and it will catch the dead spider. So, when the spider is put in a box, opening the box is a signal that it is already feeding time. Thus, for the trained spider, the time of the game is also feeding time.

The spider fight will depend on the spiders (Figure 4). If both of them are aggressive, the shorter will be the time of the game. In Misamis Occidental, specifically in Oroquieta, spider fights usually start after the corn harvest because spiders are abundant during that time. When these spiders are abundant, prices are cheaper. The game will only be less than 30 seconds if both of the spiders are aggressive. But in tournaments, it will have a maximum of 3 minutes. If both spiders are injured, the game will last for more than a minute but less than 5 minutes. The duration of the game depends on the species of spiders used. It also depends on its aggressiveness. Sometimes, it will take minutes but the spiders are already weak by that time. If one of the spiders is bitten by the other, it will become weak so the fight will only last for seconds. The game for both weak spiders will last approximately 5 minutes. In Bukidnon, spider fighting is called a tournament which takes place on a billiard table with a big stick to be gripped by two persons. Boxes will be numbered and all of those with the same number will be the pair. This will be done through draw lots. Some spiders will only hold the other, they do not bite. The fight is over when the spider will fall from the stick thrice, or when the other spider will be wrapped in a cocoon of the spider's silk.



Figure 4. Spider fighting in Northern Mindanao.

Winners will be checked for injuries and will be treated by extract of the leaves of *Moringa oleifera*, leaves of *Chromolaena odorata*, leaves of sunflower, dextrose, or honey while losers will be given away or will be fed to other spiders. For some gamers, injured spiders are released back to their habitat to mend themselves, then after a few days, they are collected again. A spider sucking its legs is an indication that it is treating its wounds. There are spiders that will treat their wounds so they are just left to stay in the box for a couple of days or put back in the garden. But, when it is a loser spider, it will just be thrown away because eventually, it will only die particularly when it was bitten by the other spider while fighting.

The bet for this game will be of big amount if the gamers pool their bets. Php500 is the minimum and Php1000 to Php4000 is the maximum in Misamis Oriental. In Lanao del Norte, bets range from Php1000 to Php3000. In Camiguin, because most of the respondents are students, the bet just ranges from Php5 to Php50. In Misamis Occidental, bet ranges from Php100 to Php1000. In Bukidnon, bets range from Php1000

to Php10000. The bet for this spider wrestling game is shown in Figure 5 where the left side indicates the number of respondents and the bottom indicates the bets and income category. The resulting correlation coefficient is 0.977332. This indicates an almost perfect positive correlation (1.00) or a high correlation coefficient, which means that the amount of the bet during a spider fighting game depends upon the income of those who bet.

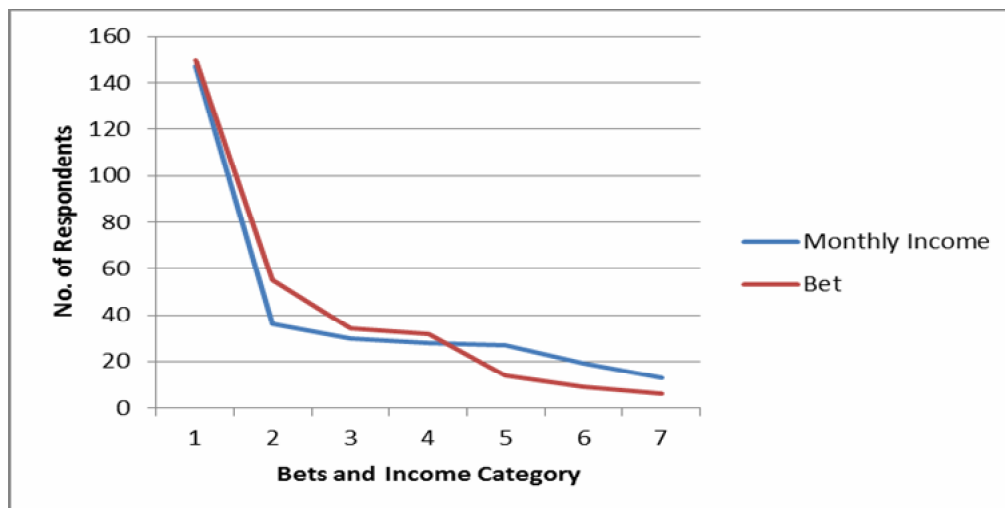


Figure 5. Income of the respondents versus their bet in the game.

The derby spiders are not poisonous but they also bite just like other organisms especially when hurt, disturbed or hungry. However, the respondents stated that the bites of these spiders range from just a little to no effect. Some answered that a spider's bite is just like the bite of mosquitoes. It is itchy and it hurts a little at the start but the feeling will just fade away. These spiders only bite on the palm of the hands.

The gamers were asked if they know the importance of these derby spiders in the ecosystem. Of the 300 respondents, only 114 (38.0%) of them answered yes. The remaining respondents did not know the significance of these organisms in the environment. According to some of the respondents, spiders have a big role in the ecosystem. They help in controlling insect pests. Also, spiders are important to achieve ecological balance. Because of this game, their population can be reduced and fewer spiders may cause an increase in insect pest population.

Spider fighting should be restricted according to 40.33% of the respondents. Some of the reasons were because it is a form of gambling or illegal vices and spiders should be taken care of and should not be used as game animals because they also have life just like humans. It should be restricted especially to children for their safety and to avoid disturbance in their studies. On the other hand, 59.67% of them answered no because it was just for fun, besides, spider wrestling is seasonal and this is also a source of income particularly to the spider peddlers. Also, this sport is traditional in the Philippines and children should also experience playing such game. Some reported that because of the fast reproduction of spiders and because these spiders are not endangered, this game should not be restricted. Others stated that these restrictions depend on the time of the year because if it is the season for this game, they cannot help but play. One of the disadvantages of this game is it causes family problems because the gamer is addicted to gambling. It is also a waste of time and money.

It appears that there is a need for policy advocacy on spider conservation since spiders play an important role in the ecosystem and not all of the gamers are aware of it. When the gamers were asked if they can identify whether their spiders are male or female, all of them answered no. They do not know that the female reproductive spiders are the ones used in the spider fighting game. These female spiders are important in the ecosystem and more populations are needed for future generations. The absence of studies in the region regarding the spider fighting game continues to hinder management efforts for conservation.

Regardless of the number of common names assigned to spiders used in wrestling, there are actually only 10 species of derby spiders used and these belong to four genera of the family Araneidae. All 216 individuals collected from gamers were females. Each of the provinces was recorded to have almost the same species captured but different in number (Table 3). Six species were recorded in Misamis Occidental, six species in Lanao del Norte, four species in Misamis Oriental, and four species in Camiguin. Only three species were noted in Bukidnon.

Table 3
Species of derby spiders collected in Northern Mindanao

Species	Misamis Oriental			Lanao del Norte			Camiguin			Misamis Occidental			Bukidnon			Total
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
<i>Cyrtophora parangexanthematica</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
<i>Eriovixia laglaizei</i>	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
<i>Neoscona facundoi</i>	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
<i>Neoscona nautica</i>	0	0	0	0	0	0	1	1	0	0	0	1sa	0	0	0	3
<i>Neoscona punctigera</i>	3	4	5	3	1	0	4	3	5	12	10	11	5	2	3	71
<i>Neoscona</i> sp.	0	0	0	0	1	0	0	0	0	0	1i	0	0	0	0	2
<i>Neoscona theisi</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Neoscona vigilans</i>	1i 14	11	9	1i 15	13	12	1i 5	1i 6	1i 6	3	5	2	11	1i 6	1i 5	130
<i>Poltys illepidus</i>	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	3
<i>Poltys</i> sp.	0	0	0	0	0	1i	0	0	0	0	0	0	0	0	0	1
Total no. of individuals	19	16	14	21	16	13	11	12	12	17	16	14	17	9	9	216
Total no. of species	3	3	2	4	4	2	3	4	2	4	3	3	3	2	2	10
		4			6			4			6			3		

All were females; i - immature, sa - sub-adult. Misamis Oriental: 1 - El Salvador, 2 - Gitagum, 3 - Medina; Lanao del Norte: 1 - Iligan, 2 - Tubod, 3 - Kauswagan; Camiguin: 1 - Mambajao, 2 - Mahinog, 3 - Sagay; Misamis Occidental: 1 - Bonifacio, 2 - Tangub, 3 - Oroquieta; Bukidnon: 1 - Malaybalay, 2 - Baungon, 3 - Kibawe.

Table 4 shows that of the 10 species recorded in Northern Mindanao, *N. vigilans* (60.19%) was the most commonly used species of derby spiders followed by *N. punctigera* (32.87%). Only in Misamis Occidental that *N. punctigera* (70.2%) recorded the highest number of individuals collected. In all the other provinces, *N. vigilans* had the most number of individuals. The total samples formed a combination of immature (4.17%), sub-adult (0.46%), and mature reproductive (95.37%) spiders.

Table 4
Frequency and percentage of each spider species

Species	Frequency (n)					Total	Percent (%)
	Misamis Oriental	Lanao del Norte	Camiguin	Misamis Occidental	Bukidnon		
<i>Cyrtophora parangexanthematica</i>	0	0	0	1	0	1	0.46
<i>Eriovixia laglaizei</i>	0	1	0	0	1	2	0.93
<i>Neoscona facundoi</i>	1	0	0	1	0	2	0.93
<i>Neoscona nautica</i>	0	0	2	1	0	3	1.39
<i>Neoscona punctigera</i>	12	4	12	33	10	71	32.87
<i>Neoscona</i> sp.	0	1	0	1	0	2	0.93
<i>Neoscona theisi</i>	1	0	0	0	0	1	0.46
<i>Neoscona vigilans</i>	35	41	20	10	24	130	60.19
<i>Poltys illepidus</i>	0	2	1	0	0	3	1.39
<i>Poltys</i> sp.	0	1	0	0	0	1	0.46
Total no. of individuals	49	50	35	47	35	216	100.0

The most common species of spiders used in the spider fighting game are *N. vigilans* and *N. punctigera*. Age structure for the two most common species was constructed for all provinces in Northern Mindanao.

The brown-legged spider, *N. vigilans*, was composed of seven immature individuals (5.38%) and 123 mature individuals (94.62%) as shown in Figure 6. This captured species was recorded to have the most number of individuals in all provinces except Misamis Occidental.

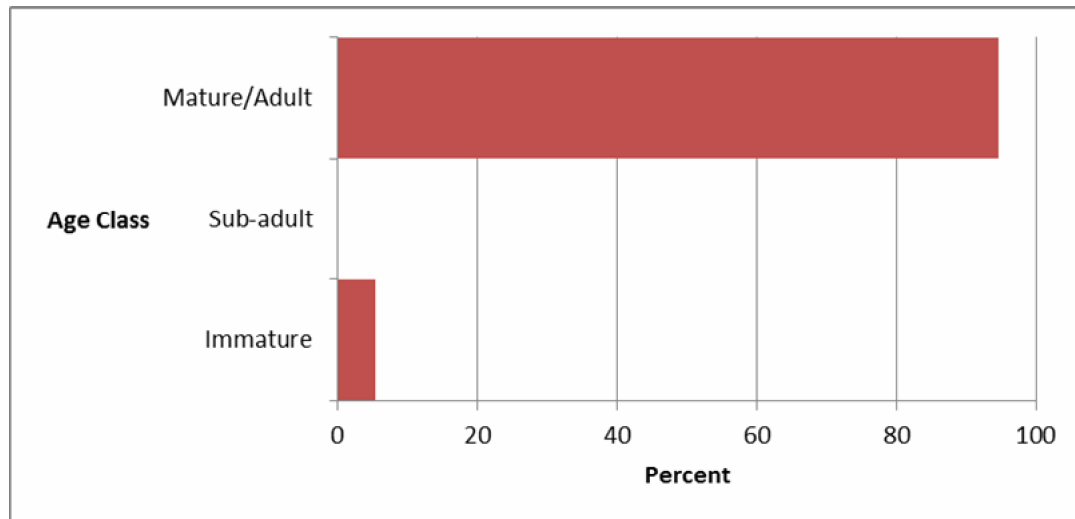


Figure 6. Age structure for the brown-legged spider, *Neoscona vigilans*.

The ghost spider, *N. punctigera* had the second most number of individuals captured during the conduct of the study. It was composed of 71 mature individuals (100.0%) and this is presented in Figure 7. This spider is usually used in the spider fighting game because of its ability and its aggressiveness according to the gamers.

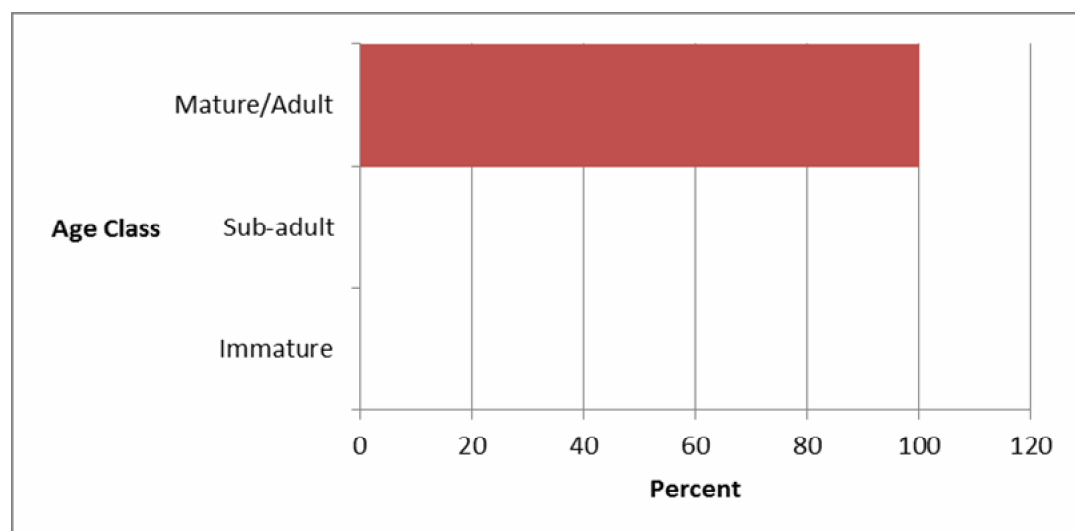


Figure 7. Age structure for the ghost spider, *Neoscona punctigera*.

The captured derby spiders were mostly adults. Hence, the decreasing population can be explained by the preference of gamers to extract mature reproductive females from the wild. Since spider fights often lead to the death of these spiders, wild populations of these spiders are perhaps left with very few females. Additional population studies of the spiders in the wild may be needed to confirm this. Population sampling of these spiders in the wild (e.g. mark-recapture technique) during peak spider wrestling season is recommended.

Conclusions. Spider wrestling is a sport which takes place in Northern Mindanao in April, June, and December where derby spiders are abundant in the field. All of the gamers are males which follow pre-fighting practices to produce the best spider fighters. *Neoscona vigilans* and *Neoscona punctigera* are the most commonly used species in the region. Age structure indicates a declining population due to the use of mature reproductive females. Because of this spider wrestling game, some of the spiders do not have a chance to produce eggs because they are used as game animals and eventually they will die before they can lay their eggs. Therefore, these animals need to be conserved and protected. This game should be restricted or limited through policy action to avoid population decline of spiders in the natural environment.

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SURVEY QUESTIONNAIRE

Name: _____ Address: _____

Age: ____5-10yrs old ____11-20yrs old ____21-30yrs old ____31yrs old and above

Gender: _____ Occupation: _____ Monthly Income: _____

The focus of this interview is to elicit information on your length of experience, practices, and preferences on spider fighting as well as learn the effects it has had on you. Data gathered will be evaluated to come up with particular conclusions on the research topic. Any answers from you will not be personally attributed to you in any reports from this evaluation. Your participation in this interview is voluntary. Do you have any questions before we begin?

1. What are the local names of the spiders?
2. How do you determine which spider to look for? What are the qualities of the spider you are looking? In terms of:
 - Sizes:
 - Color:
 - Sex:
 - Web Design:
 - Leg length:
 - Prices when sold:
3. Refer to question No. 2, which spiders are more aggressive?
4. What motivates you to play with the spiders?
5. What time of the day do you look for spiders?
 - o 6am-12nn
 - o 12nn-6pm
 - o 6pm-12mn
 - o 12mn-6am
6. Where do you most likely find a choice spider?
 - o From what kind of plant/trees
 - o Near bodies of water (lake, river)
 - o Rice fields
 - o Wire post
 - o Electric post
 - o Others, please specify _____
7. When collecting spiders, will you collect all derby spiders you encounter? Why or why not?
 - o Yes
 - o No
8. Where and how do you keep your spiders?
 - o handcrafted
 - o Store bought
 - o Found in the household {ex. plastic container, matchboxes}
 And the spiders are:
 - o Individually Separated
 - o In twos/threes
9. How do you take care of your spiders and make them ready for a fight?
 - o Fasting
 - o Feeding of Vitamins
 - o Training with weaker spiders
10. Are you willing to pay certain amount to buy spiders? If yes, why and how much?
 - o <50Php
 - o >50Php <100Php
 - o >100Php <500Php
 - o >500Php

11. How do you evaluate/put a price on the spiders?
12. What month does "spider fighting" usually start?
 - January
 - June
 - September
 - Others, please specify _____
13. How long does a match normally last? And what species is used?
 - < 30 seconds
 - < 1 minute
 - >1 minutes < 5 minutes
 - 5 minutes
14. How do the spider-fighting fans know when a fight is over?
 - One of the spider is dead
 - One of the spider falls from the stick
 - One of the spider is bitten
 - One of the spider is covered in web
15. What do you do with your injured spiders?
 - Kill
 - Throw
 - Feed to other spiders
 - Return to its original habitat
 - Others, please specify _____
16. Have you been ever bitten while handling a spider? If yes, what were the effects and what are the attributes of the spider?
 - Vomiting
 - Itchiness
 - Headache
 - Shortness of breath
 - Others, please specify _____
17. Should spider fighting be restricted? Explain your answer.
18. Are you aware of the importance of spiders in the ecosystem? If yes explain your understanding.
19. How much do you bet for a spider fight?
 - <50Php
 - >50Php <100Php
 - >100Php <500Php
 - 500Php
20. For you, what are the advantages and disadvantages of spider fighting?

Advantages:

 - Leisure/pastime
 - Source of Income
 - Way to meet friends/Socialize
 - Way to remove pest
 - Others, please specify _____

Disadvantages:

 - Vice
 - Disrupts ecosystem
 - Risk of getting bitten
 - Risk of losing in a bet
 - Others, please specify _____

Thank you for your time and ideas.