THE AFRICAN SCARE OF FALL ARMYWORM: ARE SOUTH AFRICAN FARMERS IMMUNE?

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–Abstract–

The manifestations of Fall Armyworm [FAW] (Spodoptera frugiperda) in South Africa were all clearly reminders of the seriousness of this epidemic in 2019. The scare caused by FAW as an African Moth continues to multiple largely. This is becoming a factor for African farmers, seeking urgent acknowledgement of the associated detrimental effects mapped with economic, social, environmental opportunities and fully exploitation of sustainable agriculture in the country and elsewhere. This study adopted qualitative research approach, with an aid of non-empirical research design: Systematic review, closely looking at recent reputable reports across globe, while using South Africa as a case study, from 1995-2019 (i.e. 24 years' projection). This study found that South African readiness against FAW is [currently] highly questionable, with the consequences of failing to act clearly felt by many South African farmers, therefore, the strategies geared towards this pandemic [might] not be able to totally stop the clock on its effects on farming practices, however, revisiting and adding to the available strategies can be beneficial to this sector to holistically affirm and sustain agriculture in South Africa as one of the two sectors at the core of economic development.

It is concluded that there is no single solution to respond to this elusive spread, thus, multi-agency approach is highly sought. For recommendations, available precautions should not be limited to the positive use of furrows, chemicals, clear warning to cattle farmers and swift reporting of outbreaks. The interventions of South African government [i.e. Department of Agriculture, Forestry and Forestry - DAFF] and other interested parties remains important in response. One of the essential components relates to investing more energies of understanding the ignored effects of FAW on South African farmers.

Key Words: Agriculture, [African] Fall Armyworm, African scare, Economic development, Farmers, South Africa, Sustainable development

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1. INTRODUCTION AND PROBLEM FORMULATION

The Guardian News (2018:1) provides that the destruction of Armyworms is stripping key food Crops in the Southern Africa region, with high possibilities of spreading to other parts of Africa, prompting 'Experts' on this field to issue a stern warning during the held 'Emergency Meeting' consisting of 16 African countries. It was during this meeting that the fields of Maize in these African countries; *South Africa*, Zimbabwe, Malawi and Zambia were cited to be invaded, it was also said that these countries are rated as 'Staple Crop/Corn/Maize' largest producers [i.e. South Africa and Zimbabwe] throughout the African region, deeming this plague a new threat in the Southern Africa regions. Phillips (2017:1) points out that this pest [FAW] is a 'Native to the Americas; spreading rapidly across parts of Africa in the mid-2016 posing a serious threat to food security in the African affected areas. Historically, this epidemic [i.e. a serious pest for Maize] is believed to be [mostly] associated with the Americas', dating back from the 1957, originating from the tropical regions of the United States (US), Argentina, Caribbean regions and Brazil. This species also occurs in Yemen, some Pacific Islands, and parts of Australia, Rose, Dewhurst and Page (2000:1). The first reports of this outbreaks (i.e. attributed to indigenous *Spodoptera spp* / FAW) in Africa came from several West and Central African countries early in 2016. Fast forward December 2016, the first unconfirmed reports of Armyworm damage to Maize were received from Zambia and Zimbabwe. It is also highlighted that this pest is devastating to Crops, with current impossibilities to eradicate within Southern African. The responsible stakeholders have not managed to control it effectively as it keeps evolving, for remedy, a formulation of a suitable plan for managing it is highly sought as food insecurity would worsen without a lasting workable solution (Guardian News, 2018:1).

A recent study conducted by Harman (2019:1) by the Exeter University, Centre for Agriculture and Bioscience International in the United Kingdom (UK) supported the presented notions *Supra* by indicating that in January 2016, major outbreaks of FAW first occurred in Nigeria and Ghana respectively. With other identifications reported in Benin, *São Tomé* and *Príncipe* and Togo. By September 2017, the FAW was reportedly to be present in 28 sub-Saharan African countries, South Africa included. Dean (2017:1) also submits that Maize farmers in Kenya expressed concern over the FAW threats, estimating more than 400 000

affected hectors in East Africa. (Harman, 2019:1) further avers that estimations indicated up to 50% Maize yield loss in Africa could be attributed to FAW infestations. It is believed that this pest arrived in Africa on a passenger flight from America. It is also speculated that African countries with major air transportation hubs and a warm and moist climate similar to those of the pest's natural habitat recorded the first invasions of FAW (Harman, 2019:1).

Subsequently, in January 2017, the South African DAFF received reports of an [unknown] Armyworm damaging Maize plants on farms of Limpopo and North West Provinces. This was confirmed by a 'Taxonomist' at the Animal Research Council Plant Protection Research (ARC-PPRI), Biosystematics Division, by positively identifying a male Moth specimens collected as the FAW *(i.e. Lepidoptera: Noctuidae)*. It was then established that the FAW flies on prevailing winds, has a short life-cycle and attacks a wide range of Crops, Harman (2019:1). This was rendered as a serious economic risk to the local South African farmers classified as an A1 quarantine pest on the list of the European and Mediterranean Plant Protection Organisation (EPPO) and a quarantine pest in South Africa. It was also said that this pest is 'Polyphagous' in nature showing infection preferences for 'Grain Crops,' Maize and Sweetcorn (i.e. young plants and cobs) in South Africa, with some reports of damage on Sorghum noted. Other South African reports shows damage on Spinach, Sugarcane, Rice, Lucerne, Sunflower, Wheat, Cabbages, Pepper, Soya, Potatoes, Pastures and Grasses. Harman (2019:1) also warns that the mentioned Crops are at serious risks in these countries; South-Southeast Asia and Australia from FAW related infestations if efficient measures are not taken worldwide.

Worryingly, despite the ARC-PPRI attempts to describe this pest, the 'South African Agriculture Ministry' mentions that little was known about the arrival of Armyworms and their long-term effects, only deeming it as a migratory pest similarly to the African Armyworm, which may migrate in large numbers from one area to another, causing great damage, affecting Crops such as; Sorghum, Soybeans, Groundnuts and Potatoes. Adding to this problem; was the struggle of the South African regions with the worst drought season in more than three decades in 2012 and 2015 respectively, British Broadcasting Corporation [BBC] (2017:3). Therefore, the objectives of this study was to explore the associated effects of the African scare of FAW, while establishing the readiness and immunity of South African farmers for economic and sustainable development.

2. METHODS AND MATERIALS

This study adopted a *non-empirical research design: Systematic* review, this form of research design identifies, describes available research literature 'using systematic and explicit accountable methods and pre-specified formalised tools for searching and integrating literature (Gough, Oliver & Thomas, 2012:5 and Punch, 2014:108), aided by qualitative research approach. For *data collection*; documentary sources where used, where the researchers collected qualitative documents, Creswell (2014:190) states that researcher may collect qualitative documents, for example; public documents, such as newspapers, minutes of meetings or official documents. Furthermore, one can ask questions of documents in the same ways as one might ask questions of research respondents (Matthews & Ross, 2010:282). DAFF media releases, South African online newspapers and media reports, journal articles, internet searches (i.e. Electronic databases – Google Scholar, EbcoHost, Emerald Insight, Jstor, ProQuest, Sabinet, Sage Online and Science Direct) and Famers Weekly publications among others (Creswell, 2014:190). The *sampling methods* involves the 'non-probability: Purposive sampling' focusing on data primarily relevant to the study subject. The keywords/phrases were used to filter info relevant to reach data saturation of the research problem, while applying Qualitative Content Analysis (QCA) to identify the themes to respond and verify the study objective. This was applied to present honesty reporting relating to the consulted literature, Liamputtong (2013:246). The reviewed data was restricted to 1995-2019 (i.e. 24 years' projection) to demarcate inclusion/exclusion criterion. For *data analysis*; Textual Analysis (TA) was adopted, solely depending on a very detailed analysis of the collected data.

3. LITERATURE REVIEW AND DISCUSSIONS

The African Armyworm (*Spodoptera exempta*) also known as "the *Okalombo*, *Kommandowurm*, or Nutgrass Armyworm, also branded as the African Moth is a very deleterious pest, capable of destroying entire Crops in a matter of weeks. It feed on all types of Grasses, including early stages of Cereal Crops (i.e. Corn, Rice, Wheat, Millet, Sorghum), Sugar cane, and [occasionally] on Coconut" (Odiyo, 1984:1) and Yarrow, Otindo, Gatehouse and Lubega (1981:1). The African Armyworm march in large numbers from Grasslands into Crops, often found in larger numbers during rainy season and post prolonged periods of drought, Haggis (1984:1) and Haggis (1986:1). Notably, during the long dry season in Eastern Africa of South Africa, their population densities are reported to be very low, with outbreaks rarely observed, Odiyo (1981:1).

For specifications; this Moths live-up to 10 days. With the female expected to lay a maximum of about 1000 eggs lifelong, laid in clusters on leaves, hatching in 2-5 days. The Six larval (i.e. Caterpillar) instars are completed in 2-3 weeks occurring in two morphologically distinct forms, namely: "(1) A *'gregarious' form* - black with yellow stripes, and (2) a *solitary form* - green or brown. They become 'gregarious' at higher densities; causing serious outbreaks. It should also be highlighted that this pest do not exhibit true gregarious behaviour of locusts, it is often unnoticed by farmers until Caterpillars are 10 days old and change from green to black in colour," Brown (1972:2). The *Larvae* is reported to burrow 2-3 centimeter into the ground to pupate. While, the adults emerge in 7-to-10 days (Dewhurst, 1985:3). This Moths [probably] migrate over tens and over hundreds kilometers between respective emergence and ovipositional sites (Riley, Reynolds & Farmery, 1983:2) causing the reported outbreaks as initially reported in this study, they further occur suddenly in areas that are free from infections for several months, Jahn (1995:1).

4. THE INDICATIONS OF NATIVE AND ALIEN SPECIES IN AFRICA REGION: THE ARMYWORMS

As indicated in the introduction and problem formulation section, in 2017, Zimbabwe was reported as the worst affected African country. This confirmation was supported by Monks (2017:1) by revealing that the United Nation Food and Agriculture Organisation (UN FAO) reports that this pest was then present in Seven of the country's eight provinces, with estimations of approximately 70% Crop destructions in some of these areas. This outbreak includes both the [unkown] 'Native African Armyworm' and the 'FAW' [i.e. a non-indigenous / alien and destructive species that originated in the Americas]. Adding to the introductory comments of this study, the affected chief suspects Southern African countries included South Africa, Zimbabwe, Malawi, Zambia, Namibia and Mozambique. As the introductory section of this study confirms, the presence of FAW in Africa was first reported on the Island nation of *Sao Tome* and *Príncipe* in January 2016. Other parts of West Africa, including Nigeria and Ghana were reported to be affected as well. This rendered the responsible governments of Zimbabwe and South Africa to publicly confirm the existing problem of this pest. However, the experienced damage in Africa is yet to be confirmed, with many affected countries failing to provide accurate data relating to the damage caused, BBC News (2017:2). In sequence, Zimbabwe and South Africa are pointed to be highly affected by this [new] pest. Wilson (2017:1) provides that a combination of 'native African Armyworms' and 'FAW' from the-indicated Americas are ravaging 'Staple Crops' across the Southern Africa. If uncontrolled, major food

shortages are expected. To indicate the extent of this epidemic; Coleman (2014) reports that 'Marthinus Beytell' farms, 20 kilometres from Potchefstroom (i.e. South Africa) lost about 50% of 70 hectors camp of natural [bulk] grazing [virtually] overnight. The local neighbours in the area also reported serious infestations, with additional reports of this infestations coming from Windsorton and *Letsitele*. Moreover, the effects of this outbreak continues, attacking mature and young Maize. Some parts of Mpumalanga Province were cleared of FAW by the time of conducting this study. In response; the producers in the 'Summer Rainfall Production' areas should remain vigilant and continue checking their Maize lands for possible infestations. Farmers are highly advised to report any outbreaks to the local DAFF, Coleman (2017:1).

Phillips (2019:1) agrees that recent (i.e. 2012 and 2015) drought conditions had a significant negative impact on South Africa's 2018/2019 summer Crop production, while considering lack of rain resulted in reduced damage from FAW infestations. The affected areas by FAW during the 'Summer Season' were some parts of Limpopo, Gauteng, KwaZulu-Natal and Mpumalanga Provinces. In contrast to previous (i.e. 2017/2018) "Summer Crop Production season, post the identification of FAW in the country in the [early] 2017, 'Summer Crop Production' in the North West and the Free State Provinces, along with other higher-lying areas, were reported to be largely affected by FAW during the 2018/2019 season. However, it the experienced damage cannot be exactly ascertained, with the drought conditions cited to have a big limiting impact on FAW in 2018/2019 season. Equally, Van der Walt (2019:1) highlights that the local DAFF called the Western Cape Province farmers to conduct regular checks on their lands after detecting "high numbers" of FAW Moths in the area, placing more concerns to the local farmers. Evidence-based, the FAW *Larvae* was positively identified on Sweetcorn on a farm near Clanwillian [Free State Province] and the presence of high numbers of FAW Moths were also confirmed, Phillips (2019:1). It is stated that it was not the first time that FAW occurred in this province as it was sporadically observed in the year 2018. Further investigations reveal that the FAW migrates during Autumn season, spreading to provinces, with weather conditions of high wind, this plays a pivotal role in the FAW spreads, Phillips (2019:1). Thus, the local farmers are seriously cautioned to be alert of what was happening on their farms and around them, they should check [any] 'Pheromone traps' regularly and immediately report [any] detection of FAW to relevant authorities timely, Phillips (2019:1).

For interventions, Dean (2019:1) reveals that Grain South African urged the local farmers to continue scouting for Crop pests [Caterpillars] on their lands. This

caused delayed plantings of Maize in the 2018/2019 season, especially in the Western and central Maize belt in South Africa, negatively providing major concerns for growers. For consideration, the expected impacts on certain herbivorous insect pests should form part of the plan. The presence of Caterpillars in Crops were reported by Grain South Africa in various 'Summer [Grain]' areas, including; Hennenman, Bothaville, Kroonstad and Viljoenskroon, as well as Piet Retief and in game camps near Badplaas [i.e. all in South Africa], Dean (2019:1). The resemblance of the identified Caterpillar(s) is positively linked to the 'African Armyworm' rather than the 'FAW,' or the very similar 'False Armyworm.' The local farmers are urged by the Grain South Africa in 2019 to send their respective photos of [any] Caterpillar infestations they can notice to 'Crop Watch Africa' to aid in compiling a detailed map of possible tracking distributions and prevalence of this insects. The local producers are also urged by the Grain South Africa in 2019 to keep scouting for any type of Caterpillar damage, with early detection and identification for effective control measures, Dean (2019:1).

Phillips (2017:1) points out that this pest called for reviewing of current status of FAW infestations in the Southern Africa region; this should be done by agreeing to a harmonised systems of monitoring and assessing the associated reported impacts; reviewing and adopting of current standard protocols for specific assessments; sharing country-specific experiences of related infestations and management efforts, developing frameworks for monitoring and management of FAW at regional and country levels and identifying opportunities for collaboration to sustainably manage it. The Farmer's Weekly (2017:1) reveals that the local farmers affected by FAW should often spray insecticides upon noticing this pest, immediate intervention is highly sought, it is also warned that if 5% to 10% of plants show infestations (i.e. five to 10 plants per 100 plants should inspected for possibly infections). Only products containing active ingredients already approved for FAW by the 'Registrar of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No. 36 of 1947)' should be used. The CropLife South Africa protocols added that insecticides must be applied during the early development stages of *Larvae*. Adult *Larvae* may prove to be very difficult, rendering impossibilities of effective lasting control measures, Farmer's Weekly (2017:1). The best time for application referred to instances when a *Larvae* feed on exposed leaf surfaces, where insecticides can reach them outside Cobs, Ears and Tassels Farmer's Weekly (2017:1). As soon as *Larvae* penetrate too deeply into the Whorl or feed inside the Cob, it becomes virtually impossible to effectively control the FAW. In addition, smaller *Larvae* are easier

to control than fully-grown *Larvae* and insecticides should be applied strictly according to the recommendations on the label in use.

The available control measures vary from 'very poor to adequate' with the use of Carbamates and Organophosphates often recommended. It is highly advisable to test [any] these products on a small patch for efficacy before using it on a large scale. It should be also registered that Certain strains of *Bacillus thuringiensis* may not be effective against FAW, Farmer's Weekly (2017:2). Therefore, it is vital to test products before using them extensively. It is highly advised that South Africa local producers calibrate Sprayers and Nozzles, while ensuring that they are in good working condition to deliver correct droplet size and spray volumes. The [Nozzles] need to be aimed at plant rows [i.e. and not between rows] to reach the target with the maximum spray volume. Optimal spray volumes are also recommended; on average, between 200 and 400 litres/hectors for Maize Crops should be adequate to deposit active ingredients on a target, water potential of Hydrogen (pH) and adjuvants have to be adjusted in line with the recommendations on the label (Farmer's Weekly, 2017:2).

5. CONFIRMED REPORTS OF FALL ARMYWORM IN SOUTH AFRICA: NOT IMMUME TO THIS PLAGUE

The AgriOrbit (2017:2) states that the reported damage in South Africa was mainly identified on sweetcorn and White Maize planted for seed production. "The confirmed reports came from all the districts of Limpopo Province and between Swartruggens and Mahikeng, as well as Lichtenburg in the North-West Province." However, the local DAFF is levelled with criticism based on a lack sufficient actions towards FAW in the affected areas. The local DAFF hinted that a meeting with various role-players from industries and research organisations on 25 January 2017 determines plans of action, with emphasis placed on supplying the local producers with correct advices of managing FAW; the first rendered step of this 'contingency plan' was on confirmation of identified FAW by the local farmers. AgriOrbit (2017:2) further highlights that measures are put in place by these stakeholders [DAFF included] to protect Crops and validate South African's capacity to assist other affected African countries with their Crops shortages. In terms of reporting channels, the DAFF called on the local producers to show vigilance of this pest in their Maize fields and the importance of immediately reporting any sightings was stressed. The local farmers are also urged to contact a chemical representative to advise with available control options. With regard to pest management advice, Grain South Africa distributes 'Preliminary Interim Guide' for the use of agricultural chemicals to control infestations suspected to be

linked to FAW. This guide warns the local producers to use chemicals registered for use in Maize for FAW infections - *"It is best to try those products that are registered in Maize for other Lepidoptera pests, all chemicals application must be carried out in consultation with chemical representatives. They are also reminded that pesticides will only successfully control the Larvae before they seek the cover of ears … it is also futile to try and apply pesticides once the Larvae are inside ears." Producers [farmers] can also turn to other techniques used for control of the African Armyworm, such as digging furrows,* AgriOrbit (2017:3)"

6. THE AFRICAN RESPONSIVE STRATEGIES ON ARMYWORM EPIDEMIC

Monks (2017:2) contends that neighbouring country to South Africa, such as; Zambia took [drastic] measures to respond to Armyworm. This covers over 100,000 hectares of the infested farmland as initial reported in this study. The local government to dispatched the Army [i.e. Air force] planes to spray the affected areas with pesticides, owing to the fact that the FAW are reported to be 'hard to kill species and born survivors.' The available pesticides in Africa to control this plague are currently ineffective. For best practices; in the US, genetically modified Crops are used to combat FAW, with the development of defences reported. Devastating, Brits (2017:1) adding to the introductory comments of this study, notes that several reports in the media on the existence outbreak of Armyworm in Zambia, spreading to Zimbabwe, called for the Zambia National Farmers' Union to indicates that the FAW reached at least half of the country's ten provinces by the end of 2016, further reported in seven of the eight Maize-growing provinces. This refers to 124 000 hectares of estimated damages of Zambian Maize fields.

In January 2017, Brits (2017:1) reports that Malawi became the third Southern African nation to report FAW. The initial [new] arrival of this pest was initially reported in the West and Central Africa countries [i.e. including Zambia and Zimbabwe] as initially indicated in this study. As a result, the Scientists warn that parts of Southern Africa [i.e. South Africa not immune] already hit by record droughts now face another potential food crisis resulting from the FAW threats due to the following characteristics, BBC News (2017:1): It is very hungry (and not picky), it is unknown enemy, it is [very] fast in nature, it travels far and wide, migrating long distances causing greater damage (i.e. Caterpillar), it is not just targeting any old Crop, Maize are often affected, it is hard to find and bad timing in relation to drought making less availability of food, BBC News (2017:1). For remedy; insecticides use, such as; chemicals can be effectively used to deal with

this pest during its early stages, however, post that, it can become much harder to eradicate it, as some populations of FAW develops resistance, further calling for a coordinated response. Other workable approaches involve digging trenches, employing natural predators, like birds, to eat the Worms or even burning the Crops, BBC News (2017:2). Therefore, this study presents the following identified themes in parts of African and international literature on this subject. Therefore, this pest was reported in Limpopo, Mpumalanga, North West Province and Free State Provinces (Refer to figure 1). This pest has struck us like lightning and now we have more questions than answers.

Figure 1: Distributions of Fall Armyworm in South Africa and the attacked Crops

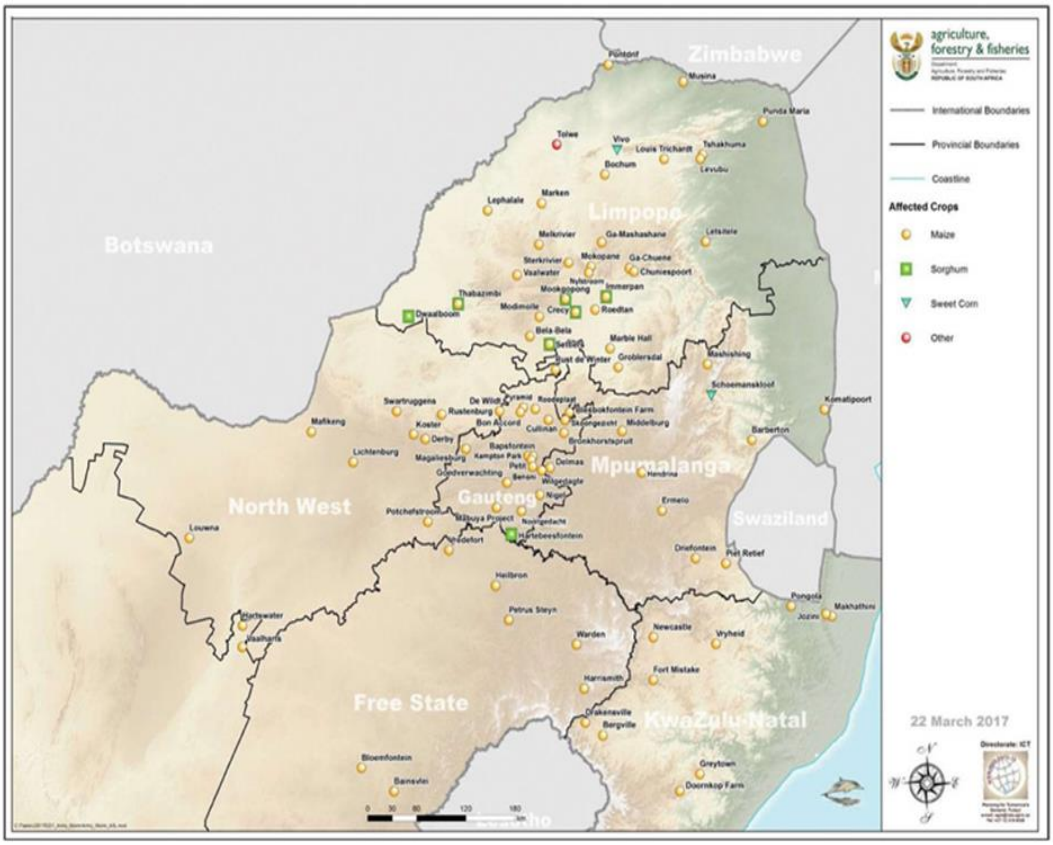

Figure 1: Distribution of fall armyworm in South Africa and the crops that were attacked.
Source: DAFF, JanHendrik Venter

Source: Erasmus (2017:1)

7. THE IDENTIFICATION OF STUDY THEMES

7.1. New south African epidemic: South African farmers' stern warning

AgriOrbit (2017:20) suggests that the FAW is regarded as a new pest to South Africa and no pesticide were previously registered to be used against it. Thus, important processes should follow to ensure that local farmers have access to right chemicals to combat this outbreak. Chemical suppliers are encouraged to apply for emergency registration of agricultural chemicals to be used on Maize and other host plants against the FAW. An interim control programme aimed to assist farmers with a guide for pesticide use as an emergency measure is communicated to various role-players and is available on DAFF website as they are products (pesticides) already approved to control *Lepidoptera* pests in Maize and other Crops that may be damaged by this pest.

7.2. The devastating nature of African and fall armyworms

The was a consensus on the cited literature as shared by Wilson (2017:1) that both the 'African' and 'FAW' do most damage to the Staple Cereal Crops such as Maize, Wheat, Sorghum, Millet and Rice. It was also revealed that they also eat 'Pasture grasses' with much devastating impacts on livestock production. The African Armyworm, can be 3-centimetre-long and can reach densities as intense as 1000 Caterpillars per square metre, quickly razing Crops to the ground. Unlike their African cousins, the FAW also feeds on a range of 'Non-cereal Crops'. Nearly 100 different host plant species have been recorded. These include the outlined Crops as discussed in the initial sections of this study. On part relating to the distribution of FAW in Africa, the ARC (2017:1) reveals that *Spodoptera.frugiperda* is native to tropical and subtropical regions of the Americas as confirmed by the introductory comments section of this study.

7.3. The best ways of stopping African and fall armyworms damaging crops and other agricultural products

As initial illustrated in the initial discussed sections of this study; chemical pesticides can be effective against [both] Armyworm species. However, the noted resistance to many chemicals is an issue for the FAW throughout its native range. It is not known whether there is pesticide resistance in the FAW blighting Southern Africa, South Africa no exception. The variable efficacy may be due to genetic resistance, or it might be as a result of the way in which the spray is applied. The FAW are often inaccessible to insecticides because of their tendency to hide in the whorls and reproductive parts of the host plant. Research is needed

to work out which chemical is the best to control the strain of FAW in southern Africa, Wilson (2017:1).

8. CONCLUSION AND RECOMMENDATIONS

The African scare of Fall Armyworm is real and the South African farmers are not immune to this plagues. In an attempt to effectively control this plague, (i.e. FAW in South Africa), the DAFF issued a Preliminary interim guide for the use of agricultural chemicals to control infestations of FAW. This guide can be downloaded on this website (i.e. http://www.daff.gov.za), the local farmers must only apply approved insecticides at the application dosage rates recommended on the product labels. Application must only be made against young instar *Larvae* which are less than 10 millimetre (mm) long. Application against older *Larvae* is not successful as they feed deep inside whorls of plants and are therefore protected from contact with the insecticide (ARC, 2017:1). AgriObit (2017:1) reports that for the control measures to be effective, the Worms must be found speedily. When they [Caterpillars] are fully grown, the use of insecticide control is often not recommended, as most of the damage to Crops will already have been done, and the emerging adults will probably move off and not produce a second generation in the same location. Another factor that plays a role in South Africa is temperature. This pest [Caterpillar] requires temperatures of between 24 and 32 Degrees Celsius to develop, and therefore anything below this will hinder development and often cause death of the *Larvae*. The notable control measures are demarcated to the following for this study (i.e. The list inexhaustible): Creation of interval furrows; The use of chemicals and Reporting of outbreaks (AgriObit, 2017:1).

Therefore, the envisaged future for this epidemic refers to the warning from the FAO is a bleak one, suggesting that things will probably get worse before they get better. The following verbatim expressions by Dr Phiri (2017) (in BBC, 2017:3) provides a summation on FAW future: *"It has just started - even those countries not currently affected should prepare themselves for possible infestations."*

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