WCCLF 2021

II World Congress on Integrated Crop-Livestock-Forestry Systems

100% DIGITAL

WCCLF 2021 PROCEEDINGS

Embrapa

AGRICULTURAL RESEARCH AND INNOVATION ON THE 2030 AGENDA

PROCEEDINGS REFERENCE

II WORLD CONGRESS ON INTEGRATED CROP-LIVESTOCK-FORESTRY SYSTEMS

ONLINE CONGRESS | BRAZIL | MAY 4^{TH} and 5^{TH} 2021

TECHNICAL EDITORS

Roberto Giolo de Almeida; Luiz Adriano Maia Cordeiro, Davi José Bungenstab, Rodrigo Carvalho Alva and Lucimara Chiari

ISBN: 978-65-994135-4-4

9 786599 413544

PREFACE

Promoted by the Ministry of Agriculture, Livestock and Food Supply - MAPA; Brazilian Agricultural Research Corporation - Embrapa; ICLF Network Association; State Secretariat for the Environment, Economic Development, Production and Family Agriculture - SEMAGRO; Federation of Agriculture and Livestock of Mato Grosso do Sul - Famasul; and FB Eventos, the II World Congress on Integrated Crop-Livestock-Forestry Systems (WCCLF 2021) took place on the 4^{th} and 5^{th} May 2021 in a 100% digital format.

The objective of the Congress was to provide a forum for discussion, theoretical insights and practical applications related to technology as well as economic and environmental aspects of mixed agricultural systems that combine integrated production of crops, animals and trees in the same area, having an efficient use of inputs, all being essential for food security in the future.

ICLF is a production strategy that integrates crop, livestock, and forestry farming in the same area, in a consortium, rotated or in succession, so that there is interaction among components, generating mutual benefits.

For two days, we discussed issues related to challenges and opportunities for ICLF systems around the World; solutions and demands from Agribusiness Companies; scenarios and trends of ICLF in the World; current hot topics in ICLF; solutions and demands for ICLF from the farmer's view; Public Policies for Supporting ICLF; and innovation on ICLF systems.

The integrated agricultural production systems can be implemented combining two or three components, according to the particularities of each farm and region. They can also be adopted in small, medium, and large farms, in different biomes, using different crops, livestock and trees species. Among the many benefits of ICLF are increasing total yields of a given area, diversification of income sources, better use of inputs, improvement of soil chemical, physical and biological qualities, along with improvement of animal welfare as well as jobs and income generation. In addition, ICLF systems reduce pressure to clear new areas, it helps to recover degraded low yielding areas while mitigating greenhouse gas emissions, increasing carbon sequestration in soil and biomass. These benefits corroborate with three of the Sustainable Development Goals - SDGs:

- SDG 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture;
- SDG 13 - Take urgent action to combat climate change and its impacts; and
- SDG 15 Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

These Proceedings report 166 scientific contributions approved by the scientific committee of the WCCLF 2021 and 18 papers from speakers that also contributed to this publication.

Cleber Oliveira Soares (Chair of the WCCLF 2021) and
Lucimara Chiari (Executive Secretary of the WCCLF 2021)

SCIENTIFIC COMMITTEE

Scientific Coordinator
Roberto Giolo de Almeida (Embrapa Beef Cattle)

Vice-coordinator
Luiz Adriano Maia Cordeiro (Embrapa Cerrados)

Members

Ademir Hugo Zimmer
Alexandre Berndt
Alexandre Romeiro de Araújo
Ana Karina Salman
Cristiana Andrighetto
Darliane de Castro Santos
Davi José Bungenstab
Edemar Moro
Emerson Borghi
Ernando Balbinot
Eurico Lucas de Sousa Neto
Fernando Antônio Fernandes
Fernando Mendes Lamas
Giampaolo Queiroz Pellegrino
Gilles Lemaire
Giovana Alcantara Maciel
Gladys Beatriz Martinez
Isabel Ferreira
Joadil Gonçalves de Abreu
José Antonio Maior Bono
José Henrique de Albuquerque Rangel
José Ricardo Macedo Pezzopane
Júlio Cesar dos Reis
Julio Cesar Pascale Palhares
Júlio Cesar Salton
Luis A Giraldo Valderrama
Luísa Melville Paiva
Luiz Adriano Maia Cordeiro
Luiz Carlos Balbino
Manuel Claudio Motta Macedo
Marcello Mele
Marcus Giese
Mariana de Aragão Pereira
Maurel Behling
Michely Tomazi
Patrícia Perondi Anchão Oliveira
Rafael Henrique Pereira dos Reis
Renato de Aragão Ribeiro Rodrigues
Renato Serena Fontaneli
Robert Michael Boddey
Roberta Aparecida Carnevalli Monteiro
Roberto Giolo de Almeida
Rodrigo da Costa Gomes
Sergio Raposo de Medeiros
Tadário Kamel de Oliveira
Teresa Cristina Moraes Genro
Valdemir Antônio Laura
Vanderley Porfírio da Silva

MONITORING PHYTOPATOGENS IN SOYBEAN AND MAIZE CROPS IN THE ILPF SYSTEM OF EMBRAPA AGROSILVOPASTORAL

Dulândula Silva Miguel WRUCK [1]; Ciro Augusto de Souza MAGALHÃES [2]; Laurimar Gonçalves VENDRUSCULO [3]

[1] Agronomist. Senior Researcher. Embrapa Agrosilvopastoral; [2] Agricultural Engineer. Senior Researcher. Embrapa Agrosilvopastoral; [3] Electrical Engineer. Senior Researcher. Embrapa Informatics

ABSTRACT
Since the 2011/2012 crop season, Embrapa Agrosilvopastoral in Sinop/MT has conducted na experiment of crop-livestock-forest integration, consisting of 10 treatments. The objective of this work was to monitor the incidence and severity of diseases in soybean and corn crops. The treatments studied were: LAV (soybean crop followed by corn + brachiaria), ILPF1 (crop-livestock-forest integration, crop rotation with livestock every 2 years); ILPF2 (crop-livestock-forest integration, with crop and animal entry after the corn harvest, every year); ILP (crop-livestock integration, crop and rotation with livestock every 2 years) and ILF (crop-forest integration). A randomized complete block design was used, with 4 replications. Analysis of variance and the means were compared using the Tukey test at 5% probability. In the soybean crop, in the 2011/2012 and 2012/2013 harvests, there were no diseases. In subsequent harvests, the incidence of target spot was always observed in the R5.1 phase. In the corn crop, in the years 2014, 2016 and 2019 the incidence of diseases was not observed. Bipolar spot was observed in 2017 and cercosporiosis was observed in the years 2015, 2017, 2018 and 2020. In both cultures, the incidence of diseases did not differ between treatments.
Key words: ILPF; soybean; corn

INTRODUCTION

The main difference between the Integrated Crop-Livestock-Forest System (ILPF) and conventional agricultural systems is to allow rural producers to be able to produce larger and more diversified production in an economically, socially and environmentally sustainable approach (EMBRAPA, 2021). In ten years, according to a survey carried out in 2018, the area occupied by ILPF increased by almost 10 million hectares, with 15 million hectares used with integration systems (REDE ILPF, 2021). The main advantages of using integrated production systems are related to the improvement of soil attributes, greater use of nutrients, breaking of the cycle of pests and diseases of plants, reduction of the economic risk, by the diversification of activities, and also reduction of costs with recovery of degraded pastures (SILVA et al., 2011; VILELA et al., 2011). Regarding the economical damages produced by pest and diseases, the objective of this work was to monitor the incidence and severity of diseases in soybean and maize crops.

MATERIAL AND METHODS

Since the 2011/2012 crop seasons, in the experimental area of Embrapa Agrossilvipastoral located in Sinop, Mato Grosso State, Brazil, a long-term crop-livestock-forest integration experiment has been conducted, consisting of 10 treatments. The treatments containing the crops are: LAV (soybean crop followed by corn + brachiaria), ILPF1 (crop-livestock-forest integration, crop according to LAV, but rotated with livestock every 2 years); ILPF2 (crop-livestock-forest integration, with LAV tillage and animal entry after corn harvest, every year); ILP (crop-livestock integration, farming according to LAV and rotation with livestock every 2 years) and ILF (crop-forest integration). A randomized complete block design was used, with 4 replications. All treatments are carried out in 2 ha plots, except LAV, where the plot is 1 ha. The soybean cultivars used were BRS Favorita (2011/12 harvest), BRS GO 8560 RR (2012/13, 2013/14 and 2014/15), BRSMG 850 RR (2015/16), M8210 Ipro (2016/17), BRS 7780 Intacta (2017/18), BRS 7380 RR (2018/19) and TMG 1180 (2019/20). The maize materials used were DKB 175 Pro (2011/12 harvest), AG 9010 Pro (2012/13), DKB 390 Bt (2013/14), DKB 175 Vt Pro (2014/15 and 2015/16), P3431VYH (2016/17), B2810PW (2017/18, 2018/19 and 2019/20). The forest component is the eucalyptus *Urograndis* clone H13, planted in an east-west direction, the crops were conducted according to technical recommendations, uniformly, in all treatments. In the case of soybean crops, fungicide spraying was carried out to prevent Asian soybean rust. The assessments of severity and incidence of diseases in the area of the soybean crop were carried out at the beginning of flowering (R1) and grain filling (R5.1), in the middle third portion of the plants. The evaluations of severity and incidence of diseases in the area of the corn crop were carried out in the milky grain phase, always on the ear leaf. Lastly, the data were subjected to analysis of variance and the means were compared using the Tukey test, at 5% probability.

RESULTS AND DISCUSSIONS

Related to the soybean crop, 2011/2012 and 2012/2013 crop seasons, no disease incidence was observed. In subsequent seasons, the incidence of target spot (*Corynespora cassiicola*) has always been observed in phase R5.1, in a generalized and uniform manner. The crops with the highest occurrence of the disease were 2015/16 and 2019/20 (15%), and in the 2016/17 crop (11%), however, no difference was found between treatments. The different production systems, under the same disease control management, had no influence on the occurrence and/or severity of the target spot in the soybean crop. No other diseases were observed, including Asian soybean rust. Considering corn crop, during off-season interval of 2014, 2016 and 2019, the incidence of diseases in the crop was not observed. Incidence of bipolar spot was only observed in 2017 (10%) and the severity of cercosporiosis was observed in the years 2015 (1%), 2017 (3%), 2018 (10%) and 2020 (2%), but not no difference was found between treatments. The different production systems had no influence on the occurrence and/or severity of cercosporiosis and bipolar spot in the corn crop. The genetics of the material used and/or the climatic conditions (rain/drought transition) may have influenced a lower incidence and severity of these diseases.

CONCLUSIONS

The different production systems had no influence on the occurrence and/or severity of diseases in soybean and corn crops. The genetics of the material used for both crops and/or the climatic conditions (rain/dry transition) for corn, may have influenced a lower incidence and severity of diseases.

REFERENCES

REDE ILPF. **ILPF em números.** Available at: https://www.redeilpf.org.br/rede-ilpf/ilpf-em-numeros. Accessed on: Mar. 2021.

EMBRAPA. **Adoção de ILPF aumenta renda e sustentabilidade em propriedade de Goiás**. Available at: http:// www.embrapa.br/https://www.embrapa.br/busca-de-noticias/-/noticia/53171817/adocao-de-ilpf-aumenta-renda-e-sustentabilidade-em-propriedade-de-goias Accessed on: Mar. 2021.

SILVA, R. F. DA; GUIMARÃES, M. DE F.; AQUINO, A. M. DE; MERCANTE, F. M. Análise conjunta de atributos físicos e biológicos do solo sob sistema de integração lavoura-pecuária. **Pesquisa Agropecuária Brasileira**, v.46, n.10, p.12771283, 2011.

VILELA, L.; MARTHA JÚNIOR, G.; MACEDO, M. C.; MARCHÃO, R. L.; GUIMARÃES JÚNIOR, R.; PULROLNIK, K.; MACIEL, G. A. Sistemas de integração lavoura pecuária na região do Cerrado. **Pesquisa Agropecuária Brasileira**, v.46, n.10, p.1127 1138, 2011.