

Production and economic efficiency in the cultivation of strawberry (*Fragaria × ananassa* Duch.) depending on the method of protection

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INTRODUCTION

The production of berries plays an important role in Polish horticulture. The data of the Institute of Agricultural and Food Economics (BIP) shows that in 2020 the area of berry crops was 146.7 thousand ha, which accounted for 37.08% of the total area of fruit trees and shrubs cultivated. Strawberry crops accounted for the largest share in this area (34.15%). Their production is favored by favorable climatic and soil conditions. According to Trejer and Krzyżanowska (2017), the above conditions, combined with structural changes, the social situation and historical realities, made Polish agriculture highly predisposed to use ecological production methods. The consumption of chemical means of production in Poland has always been lower than in most European countries, therefore the ecological quality of the production space in agriculture and its biodiversity are among the best in Europe. This is particularly important in the context of the goal set by the European Commission in its "Farm to Fork Strategy" and the EU Biodiversity Strategy. According to the documents, it concerns the allocation of at least 25% of agricultural land in the EU to organic farming and a significant increase in organic aquaculture by 2030. Hence, research in the field of production and, above all, economic efficiency of ecological farming seems to be very important. The above facts including the interests of producers justify the need for systematic research on the production and economic efficiency of ecological farming, including the production of berry fruits.

The aim of the research was to evaluate the production and economic efficiency of fruit production of three strawberry varieties, depending on the protection methods used.

MATERIAL AND METHODS

The research was carried out in 2018–2020 in 8 specialized horticultural farms growing strawberries for processing in the Podkarpackie Province. All farms belonged to or cooperated with a producer group dealing with the cultivation of organic fruit. Four of them were cultivated exclusively organically, while the remaining four were cultivated conventionally. The analysis focused on the comparison of the yielding of 3 strawberry cultivars Honeyoe, Aprica and Dipred, taking into account two methods of protection: conventional and ecological. The choice was not accidental because they are recommended by breeders, among others for organic farming, in the production of strawberries for processing. A comparative analysis of the economic efficiency of production of the researched strawberry varieties depending on the protection method was also carried out. All plantations, both conventional and organic, were carried out in the same cultivation technology. Strawberries were grown on raised beds lined with black agrotexile in a two-row system.

RESULTS

The yield is one of the most important determinants of the profitability of fruit production. The conducted analyzes show that the level of obtained strawberry yields varied from year to year depending on the protection method and within the varieties tested. Moreover, the analyzes showed that the yields of strawberries in organic plantations were higher in conventional production, in three years for Honey and two years for Aprica and Dipred (Fig. 1.). In general, in the analyzed farms, regardless of the method of protection, the highest yields were obtained in 2018, because it was the first year of plant fruiting, and the lowest in 2020, which was the last year in which the plants bore fruit, and then the plantations were liquidated. This is in line with the general tendency and practice to ensure that strawberry plantations, even for processing, are not older than 3 years of fruiting.

The overall production costs were higher by an average of PLN 22 thousand. in organic crops compared to conventional ones (Fig. 2). On the other hand, outlays for the protection of organic plantations were almost 50% higher than those on conventional plantations. This was due to the fact that ecological protection required much more treatments as compared to the protection of conventional plantations. Moreover, organic preparations were more expensive than pesticides. The higher level of overhead costs in ecologically protected plantations was also influenced by much higher labor outlays, especially plantation care. Unit costs in plantations managed with organic methods were higher from PLN 0.81 to PLN 2.43, depending on the year and variety, than those carried out with the conventional method. Moreover, as the research shows, despite the higher costs of ecological protection, the economic efficiency of these plantations was comparable or higher than conventional ones which was mainly influenced by higher selling prices for organic fruit and a higher yield level (Fig. 3).

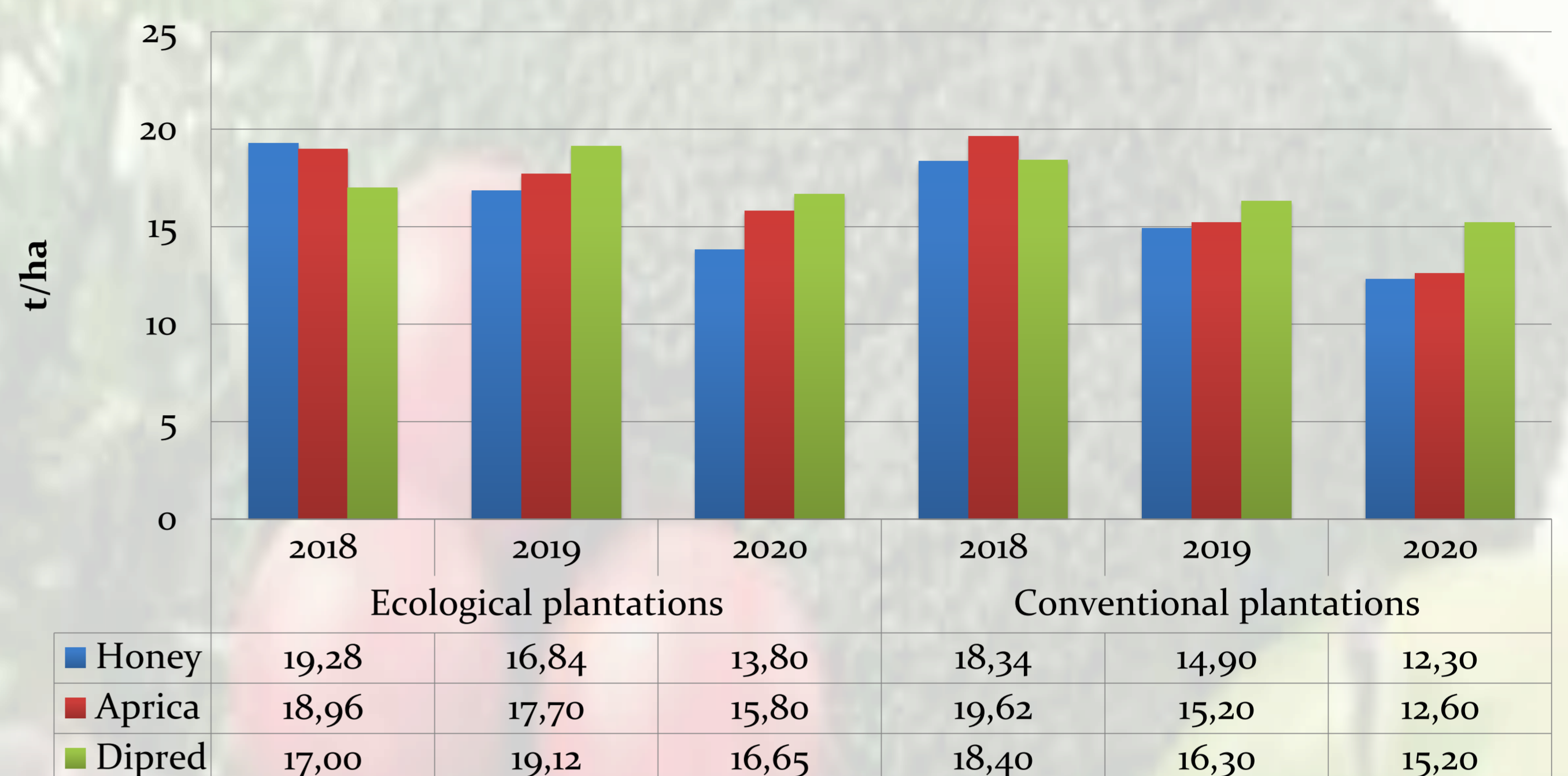


Figure 1. The yield of three strawberry cultivars depends on the method of protection, in the years 2018–2020 in tone-ha-1 Source: Author's own study

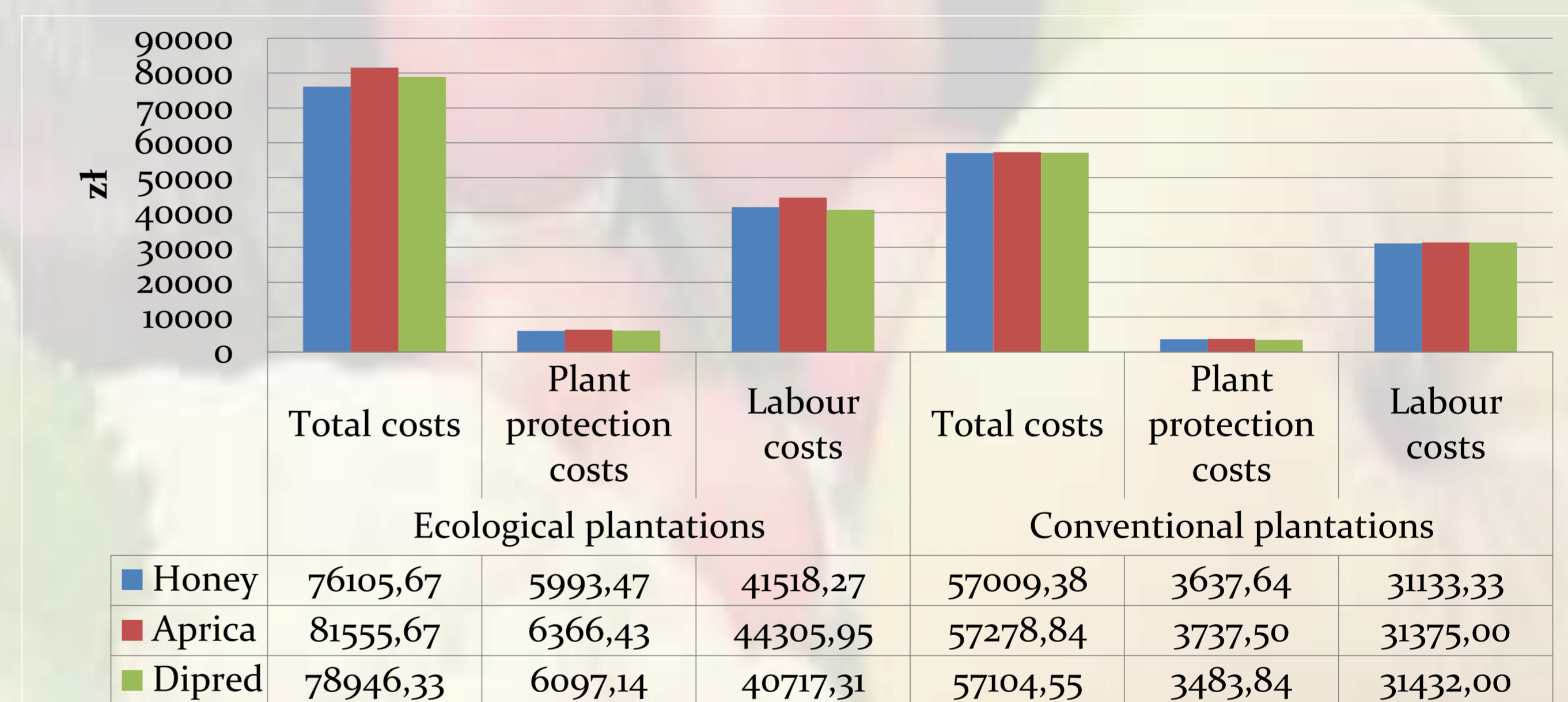


Figure 2. The costs in strawberry production, depends on the method of protection (average from of the years 2018–2020, in PLN)

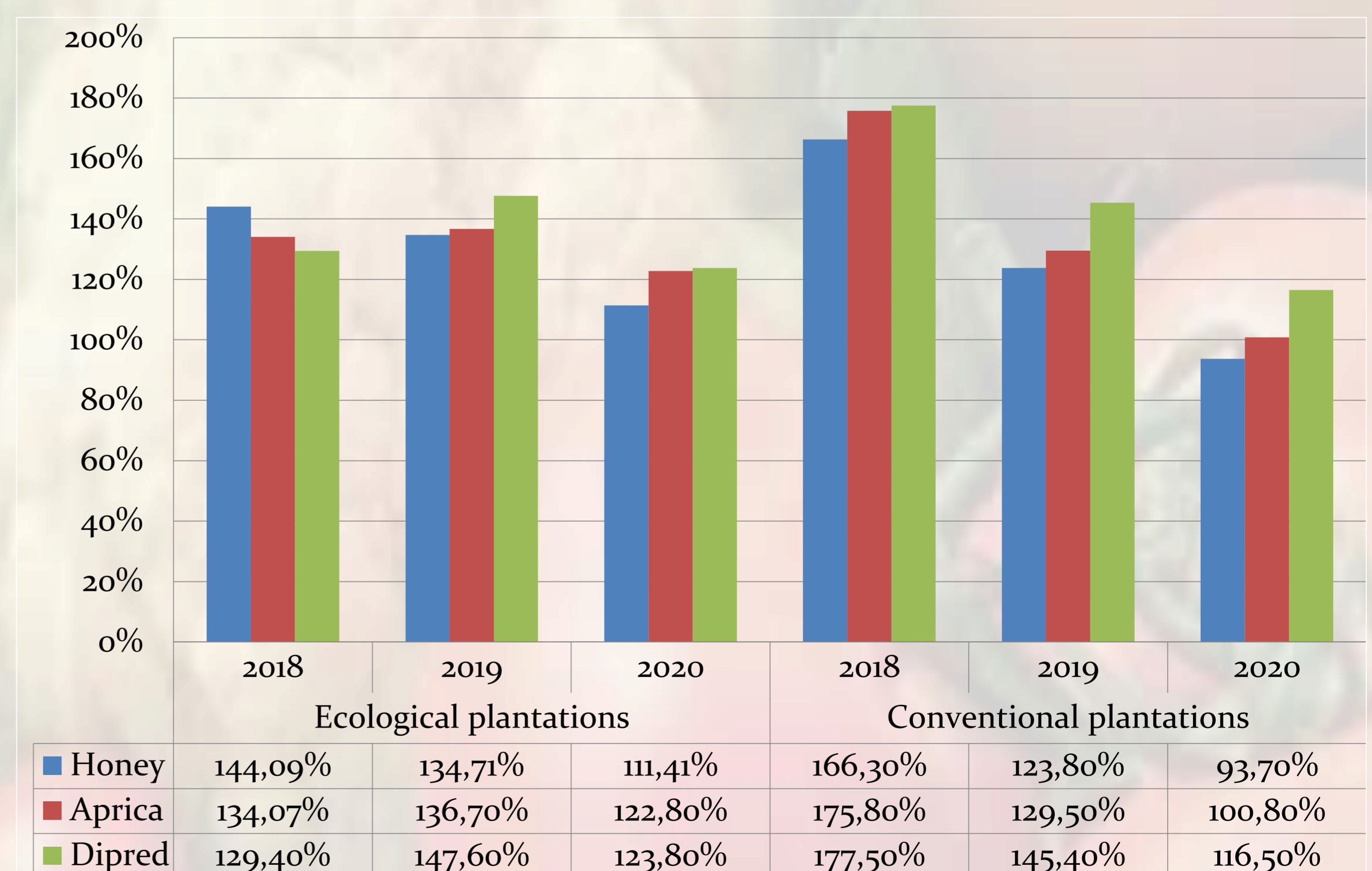


Figure 3. Profitability of strawberry production, depends on the method of protection, in the years 2018–2020 in %