



INTRODUCTION

About 40% of the world's agricultural production losses are attributed to the presence of pests and diseases. Among these pests, viruses, fungi and nematodes account for most of the emerging diseases worldwide. The aim of the present work is to analyse the available commercial cultivars of the genus *Cucurbita* sp. such as courgette and pumpkin, quantifying the different resistances to diseases caused by viruses, fungi and nematodes that they possess and relating it to the presence of diseases that limit their production. For this purpose, data was collected from the Portagrano manual, 2023 edition (1).



Figure 1. Types of fruit from different accessions of *C. maxima* and *C. moschata*.

BACKGROUND

From the 299 cultivars of the genus *Cucurbita* on offer, 106 are courgettes (*C. pepo*), 162 are pumpkins for food use (*C. moschata* or *C. maxima*) and 31 are intended for use as rootstocks, and are mostly hybrids of *C. maxima* x *C. moschata*. Among the most threatening viruses for courgette and pumpkin cultivation in south-eastern Spain we can find aphid-borne viruses, such as *Potyvirus*, and those transmitted by the whitefly, *Bemisia tabaci* (2). Oidium, soil fungus and nematodes also imply a threat to crop development (3,4).

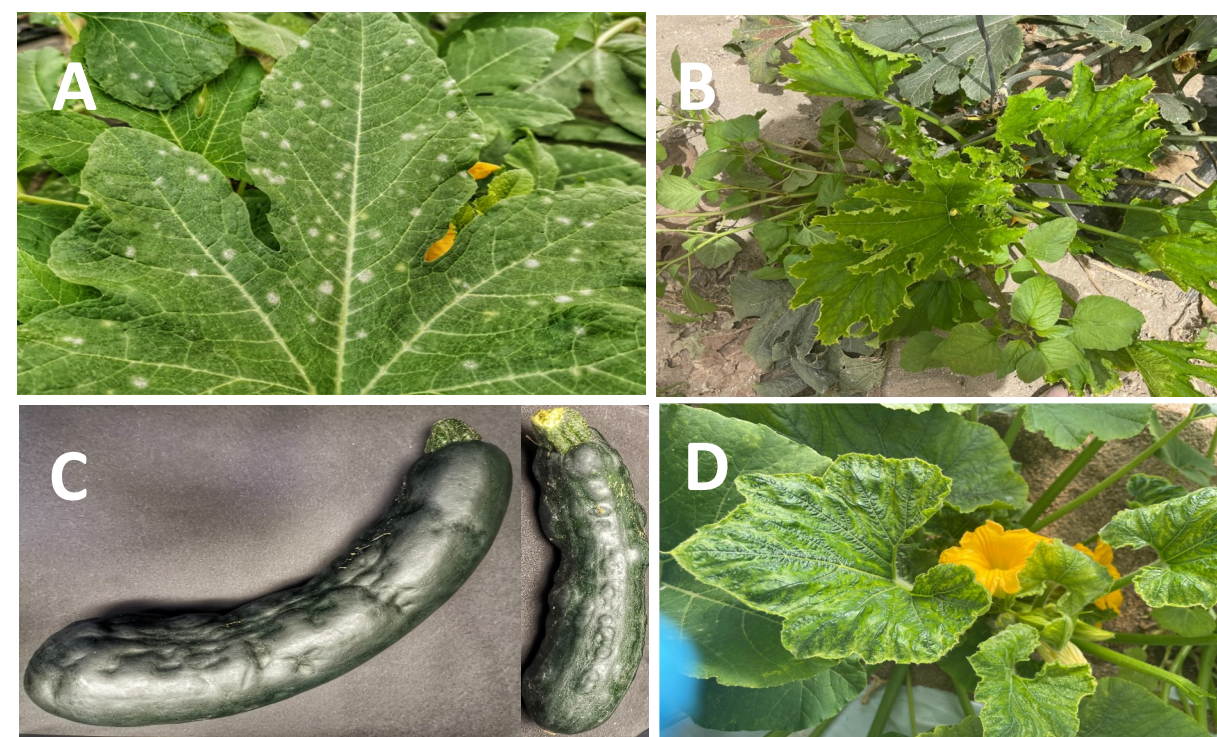


Figure 2. Symptoms of powdery mildew (A), *Potyvirus* (B, C) and ToLCNDV on plants of the genus *Cucurbita* sp.

Virus	
Name	Genre
Zucchini yellow mosaic virus, ZYMV	<i>Potyvirus</i>
Watermelon mosaic virus , WMV-2	<i>Potyvirus</i>
Moroccan watermelon mosaic virus, MWMV	<i>Potyvirus</i>
Papaya ring spot virus , PRSV	<i>Potyvirus</i>
Cucumber mosaic virus , CMV	<i>Cucomovirus</i>
Cucurbit aphid-borne yellows virus, CABYV	<i>Polerovirus</i>
Tomato leaf curl New Delhi virus, ToLCNDV	<i>Begomovirus</i>
Fungi	
Name	Typology
<i>Podosphaera xanthii</i> , <i>Glovinomyces cichoracerum</i>	Powdery Mildew
<i>Fusarium solani</i> f. sp. <i>Cucurbitae</i> , <i>Phytophthora capsici</i>	Soil Fungus
Nematodes	
<i>Meloidogyne</i> spp	

Table 1. Main diseases affecting members of the genus *Cucurbita* sp.

EVALUATION OF THE AVAILABLE RESISTANCES

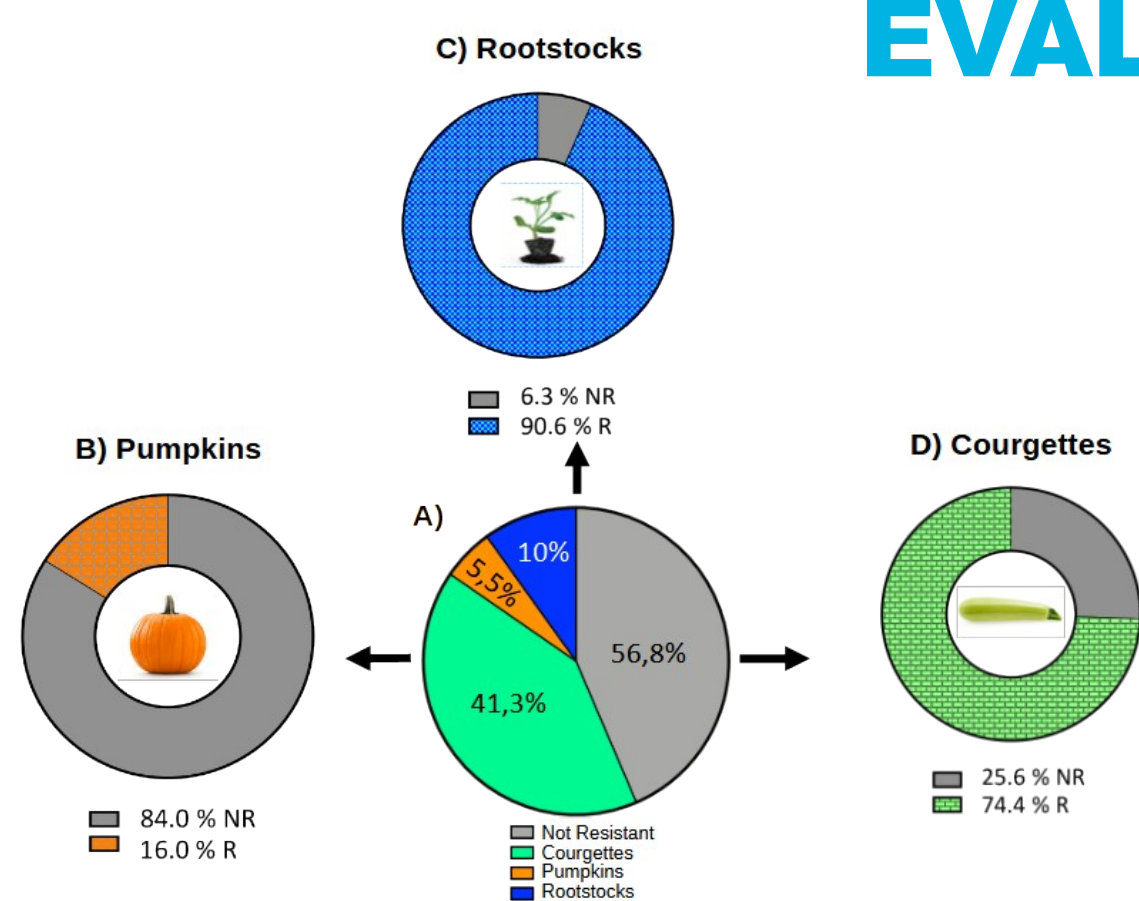


Figure 3. Percentages of *Cucurbita* sp. (A), pumpkin (B), rootstock (C) and courgette (D) varieties carrying some resistance.

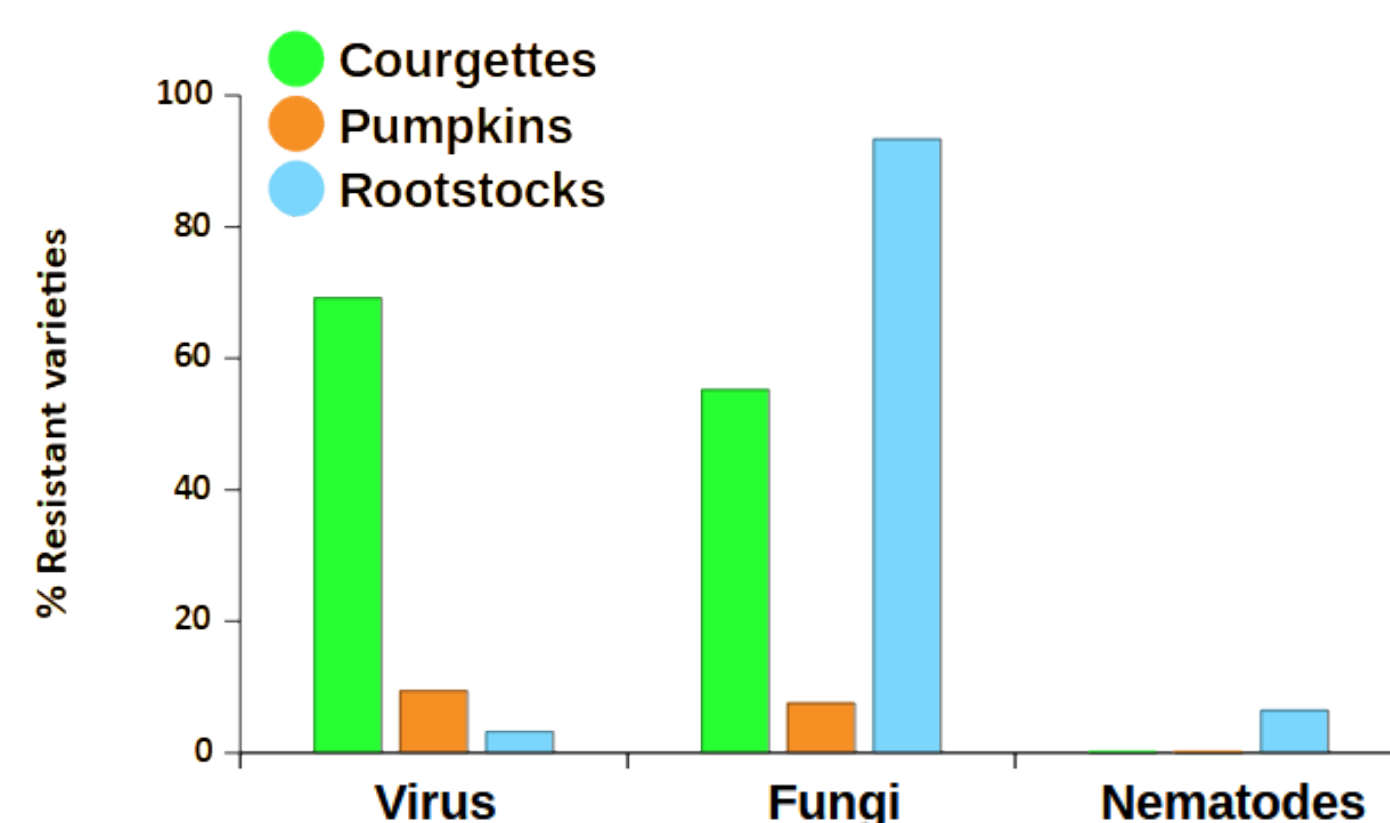


Figure 4. Percentages of *Cucurbita* sp. varieties with resistance to viruses, fungi and nematodes.

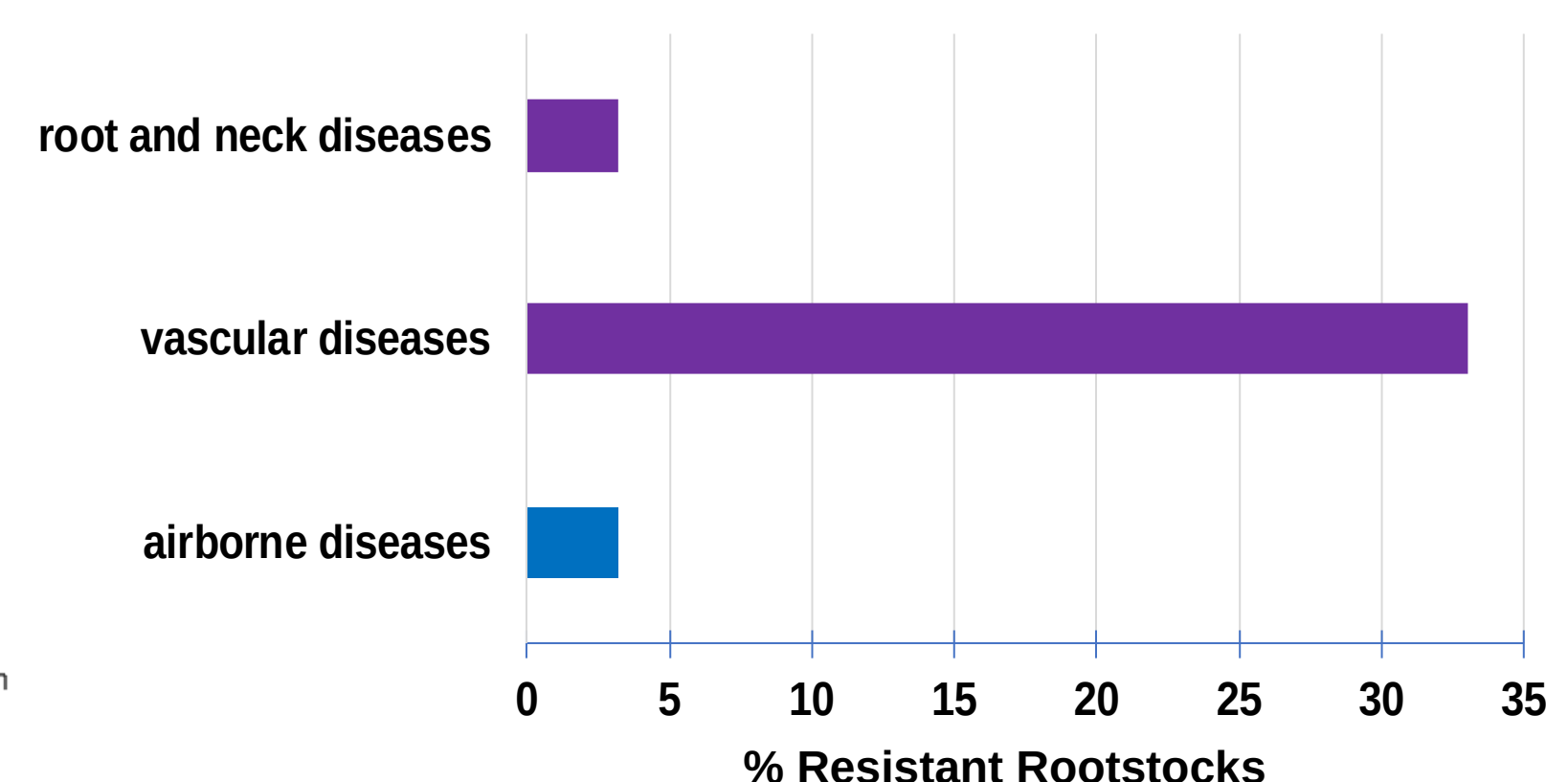


Figure 5. Main rootstock resistances.

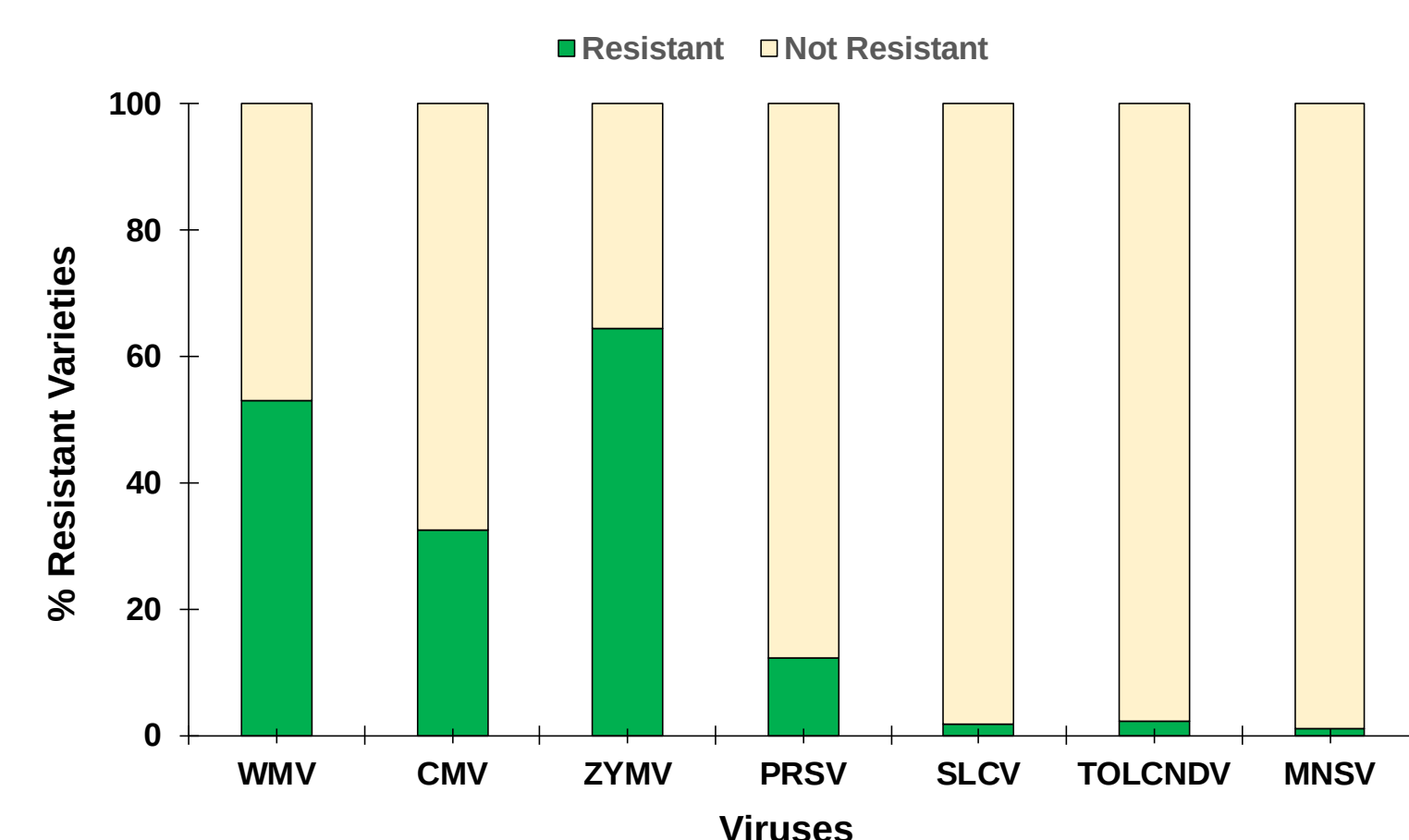


Figure 6. Percentages of virus resistant varieties of *Cucurbita* sp.

REFERENCES

- (1) Marín, J. Ediciones AMV.
- (2) Ruiz, L.; et al. Plant Pathol. 2017, 66,
- (3) Ayala-Doñas et al., Agronomy, 2020, 10: 1641.
- (4) De Cara, M et al. Spa. J. Agri. Res. 2018, 16:e1005-12 pp.

More than half of the varieties of *Cucurbita* sp. do not carry any disease resistance genes.

84% of pumpkins have no resistance, while 90.6% of rootstock varieties and 74.4% of courgettes are resistant to some disease.

69.2% of the courgette varieties carry some virus resistance, while only 9.2% of the pumpkins and 3.2% of the rootstocks do.

Resistance to fungal diseases is the most common in rootstocks (93.3%).

Most of the virus resistant cultivars are resistant to ZYMV, WMV and CMV (69.54, 55.75 and 33.33% respectively), to a lesser extent to PRSV and ToLCNDV (16.67 and 2.30%).