Shooting with DJI Mavic 3M : What is the maximum speed of the drone to obtain a clear image?

- When mapping large fields, it is important to be able to shoot at the **highest possible drone** speed without compromising **image quality**
- The DJI Mavic 3E and 3M drones are equipped with a 20 MPixels RGB camera with a **mechanical shutter** up to 1/2000 s. This device avoids the rolling shutter phenomenon, which is essential for photogrammetry
- But what is the drone's speed limit? Can we rely on the limit imposed by DJI Pilot 2? It is important to note that the maximum speed you can apply does not take into account the camera's shutter speed
- As it was difficult to obtain clear answers to these questions, I decided to carry out my own **test in real-life conditions**

Material and methods

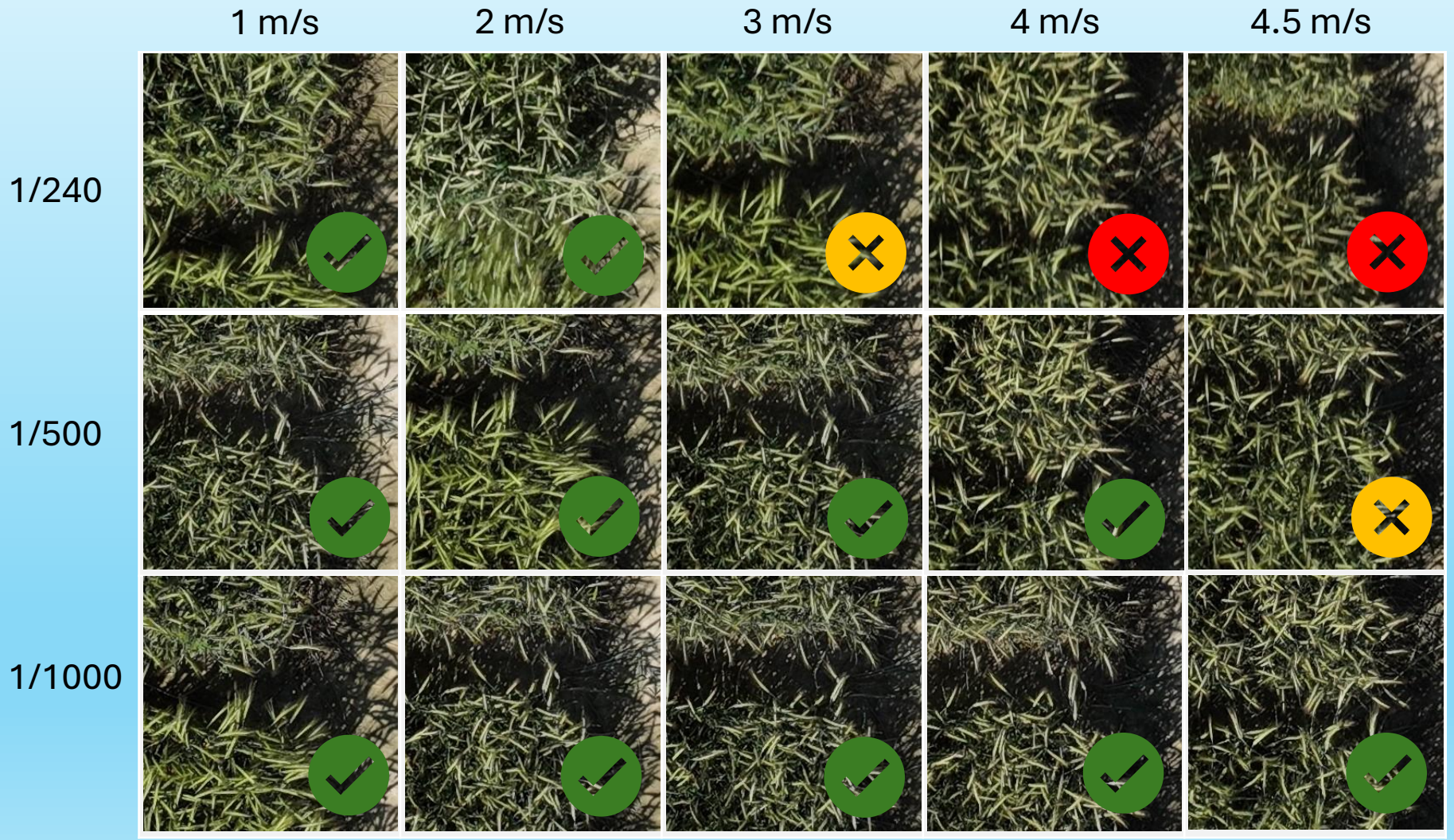
- DJI Mavic 3M, RGB mode only (20 MPx camera, 4/3 sensor, lens equivalent 28mm)
- Clear sky, wind below 4m/s
- 2 days shooting, from 3:30 to 4:30 local time
- 4 flight altitude (15, 19, 30 and 38m)
- 5 drone speed, including the highest permitted by DJI pilot 2 with this drone
- S (speed) mode, at 1/240, 1/500 and 1/1000 shutter speed

➡ Total of 60 flights

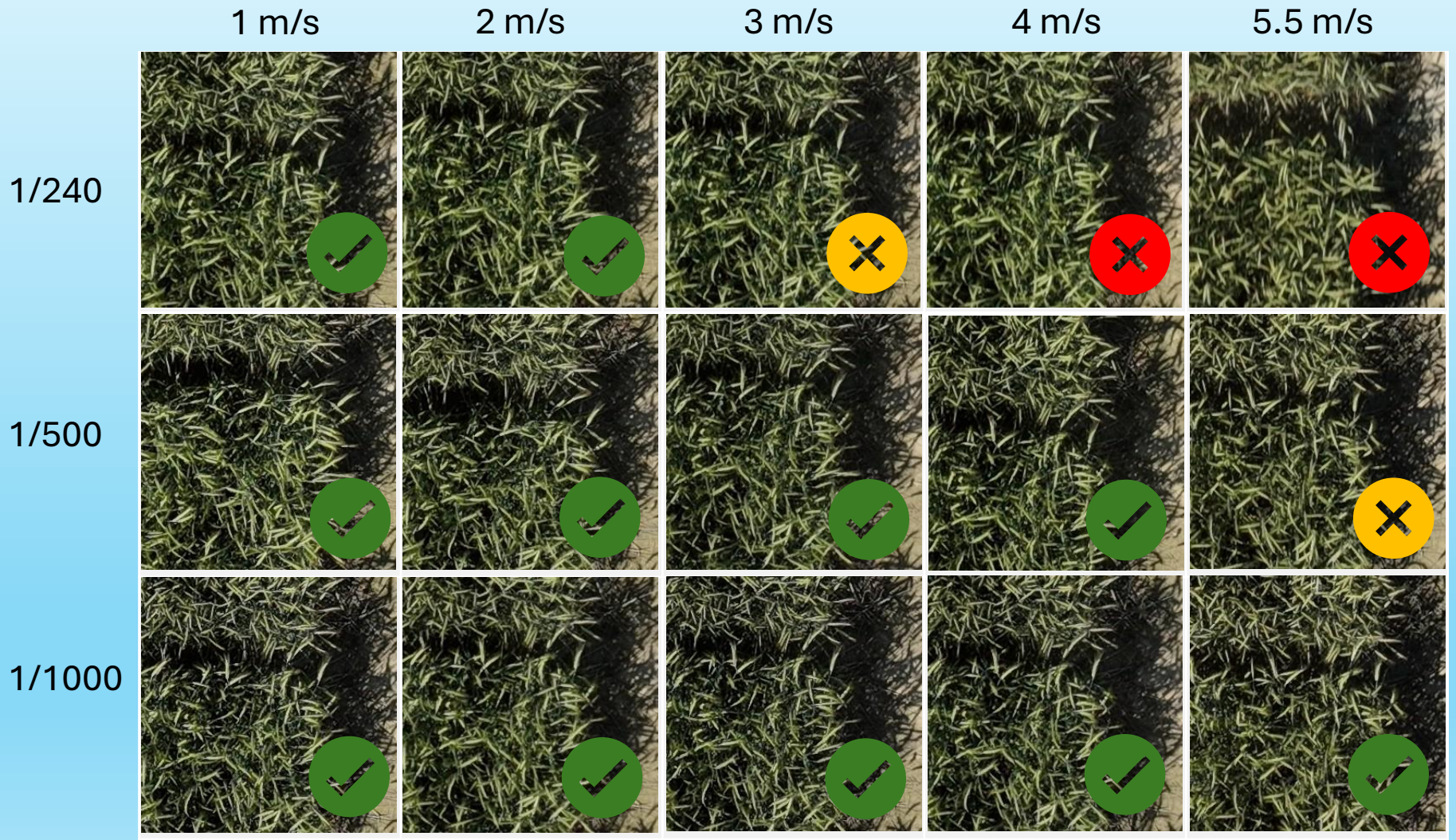
- Visual assessment of the sharpness on a 300 x 300 pixels crop at the center of the image

Good  Questionable  Bad 

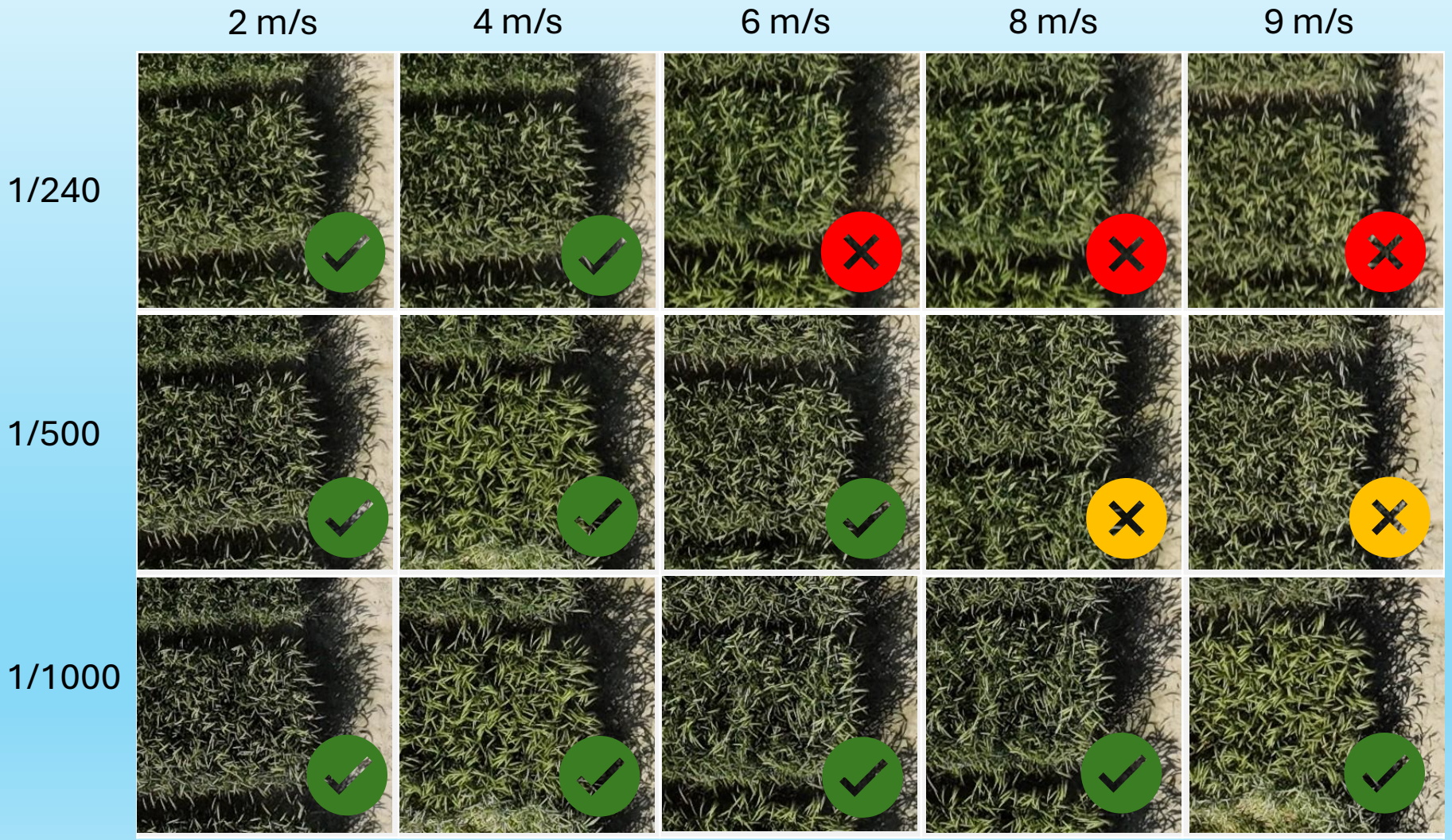
Flight altitude = 15 m (GSD = 0.4 cm/pix)



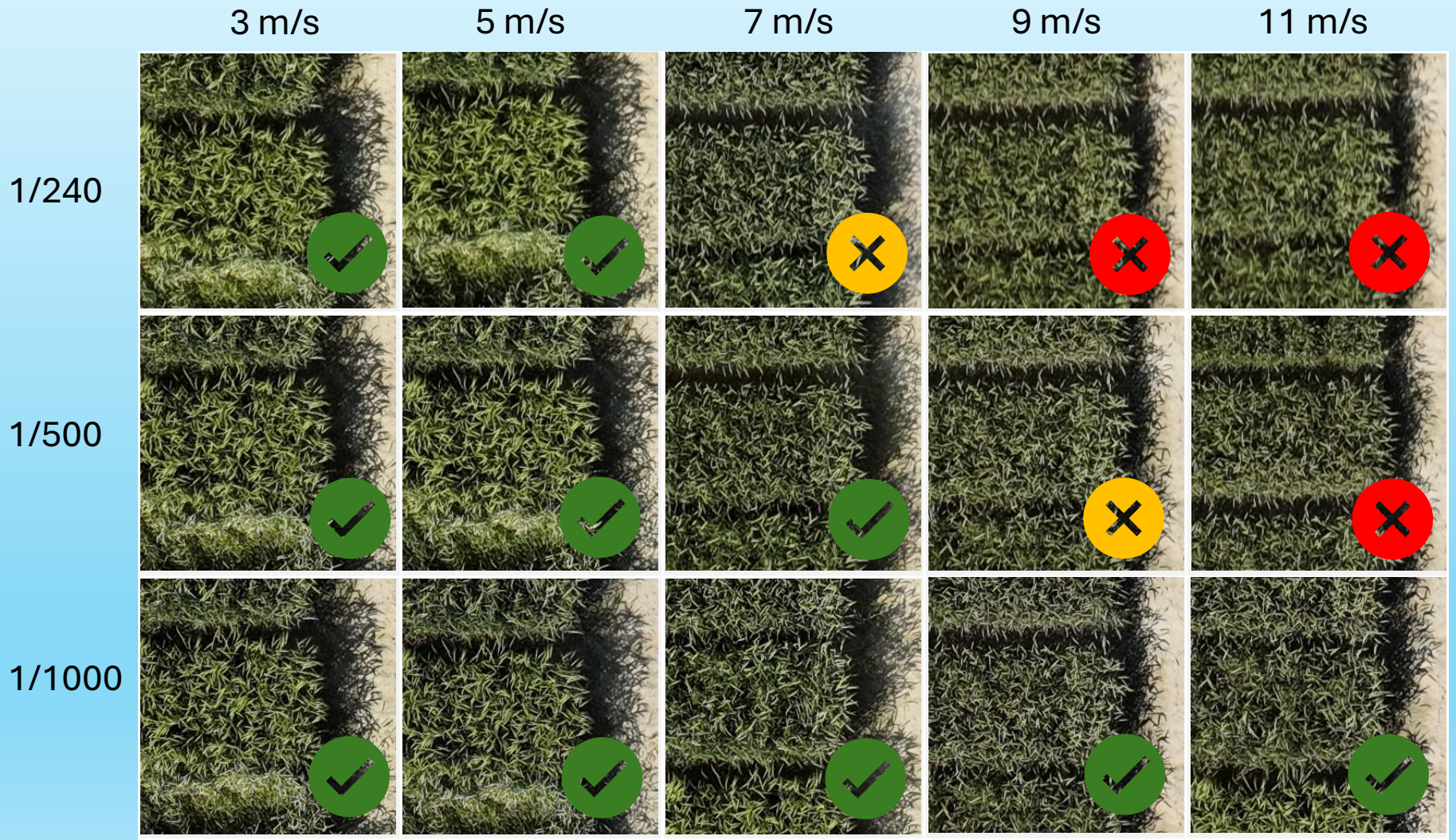
Flight altitude = 19 m (GSD = 0.5 cm/pix)



Flight altitude = 30 m (GSD = 0.8 cm/pix)



Flight altitude = 38 m (GSD = 1cm/pix)



Conclusions

Thanks to the mechanical shutter, at 1/1000s you can fly at the maximum speed allowed by DJI Pilot 2, for all the altitudes studied here

For lower shutter speeds, I recommend limiting the forward speed following this table

		Altitude			
		15 m	19 m	30 m	38 m
Shutter speed	1/240	2	2	4	5
	1/500	4	4	6	7
	1/1000	4,5	5,5	9	11

Recommanded flight speed in m/s