How Does the Aspect Ratio of a Wing Affect the Lift Per Unit Area of the Wing?

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In our world, there is an incredibly vast range of planes, all with different purposes. To suit these purposes, different planes require specific characteristics. One major characteristic, which varies from plane to plane, is the wing. Wings are specifically designed in a particular way to suit their purpose. The most significant feature of a wing, which immediately indicates the planes purpose and performance, is the aspect ratio. The aspect ratio is the ratio of the span to the chord of the wing. Different aspect ratios are suitable for different planes. This essay investigates how the aspect ratio of a wing affects its lift per unit area. The research question of this essay is: “How does the aspect ratio of a wing affect the lift per unit area of the wing?” The investigation is done through an experimental procedure; six different wings with different aspect ratios were built, these were then mounted on an apparatus, which was also built, and the lift of each was then measured by measuring the difference in weight of the apparatus when air was accelerated towards it using a fan. The findings of this experiment indicated that as the aspect ratio of a wing increased, the lift per unit area also increased, proving that the two variables are proportional. Also, it was discovered through research that aspect ratio is inversely proportional to the drag force of a plane. Therefore, this essay concludes that aspect ratio is proportional to the lift to drag ratio of a plane. This conclusion is significant as it indicates the type of aspect ratio a plane should have to suit its purpose thus may be helpful to any aircraft design, such as military or transport aircraft. Also, it allows one to understand the purpose of an aircraft simply by examining its wing.

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