**Supplementary tables**

**Table S1. Variations in net CO2 assimilation in strawberry plants. Data from the sources indicated in the table. CE = controlled environment. PPF = photosynthetic photon flux. A = Net CO2 assimilation per leaf area. AQY = Apparent quantum yield. s.e. = standard error.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Setup** | **Duration** | **Genotype** | **CO2 (ppm)** | **Temperature** | **PPF****(µmol/m2/s)** | **Range in A****(µmol/m2/s)**  | **Mean A****(µmol/m2/s) ± s.e.** | **Mean AQY ± s.e.**  |
| Hancock et al. (1989a) | Field | Long-term | Seven commercial cultivars |  |  |  | 16.6-22.4 | 19.7 |  |
| Hancock et al. (1989b) | CE | Short-term | *F. chiloensis* |  | 22o to 28oC | 1,000 |  | 21.5 |  |
| Hancock et al. (1989b) | Field | Short-term | *F. chiloensis* |  | 22o to 28oC | 1,000 |  | 15.9 |  |
| Hancock et al. (1989b) | CE | Short-term | *F*. ×*ananassa* |  | 22o to 28oC | 1,000 |  | 15.4 |  |
| Hancock et al. (1989b) | Field | Short-term | *F*. ×*ananassa* |  | 22o to 28oC | 1000 |  | 11.2 |  |
| Cameron & Hartley (1990) | CE | Short-term | *F*. ×*ananassa* | 376 | 25.6oC | 1,100 |  | 14.6 | 0.030 |
| Cameron & Hartley (1990) | CE | Short-term | *F*. *chiloensis* | 376 | 25.6oC | 1,100 | 4.6 to 6.7 | 21.4 | 0.038 |
| Fallahi et al. (2000) | CE | Short-term | Two commercial cultivars |  | 20oC | 850 to 1,100 | 13.5 to 16.1 | 14.8 **±** 0.9 |  |
| Serçe et al. (2002) | CE | Long-term | Twenty-one genotypes | 350 | 20oC |  500 | 6.0 to 15.3 | 11.2 **±** 0.5 |  |
| Serçe et al. (2002) | CE | Long-term | Twenty-one genotypes | 350 | 30oC |  500 | 2.9 to 12.4 | 6.7 **±** 0.4 |  |
| Serçe et al. (2002) | CE | Long-term | Two commercial cultivars | 350 | 20oC |  500 |  | 11.6 |  |
| Serçe et al. (2002) | CE | Long-term | Two commercial cultivars | 350 | 30oC |  500 |  | 6.7 |  |
| Serçe et al. (2002) | CE | Long-term | Nine cultivars of *F. virginiana* | 350 | 20oC |  500 |  | 10.4 |  |
| Serçe et al. (2002) | CE | Long-term | Nine cultivars of *F. virginiana* | 350 | 30oC |  500 |  | 7.9 |  |
| Serçe et al. (2002) | CE | Long-term | Ten cultivars of *F. chiloensis* | 350 | 20oC |  500 |  | 11.7 |  |
| Serçe et al. (2002) | CE | Long-term | Ten cultivars of *F. chiloensis* | 350 | 30oC |  500 |  | 5.4  |  |
| Keutgen et al. (2005) | CE | Short-term | Two commercial cultivars | 800 | 25oC |  800 | 4.3 to 5.5 | 4.9 **±** 0.2 |  |
| Klamkowski & Treder (2008) | CE | Short-term | Three commercial cultivars |  |  |  |  | 5.4 **±** 0.3 |  |
| Harbut et al. (2010) | CE | Long-term | Wild species of *Fragaria* | 400 | 30o/25oC |  425 | 8.9 to 11.4 | 10.0 **±** 0.5 |  |
| Harbut et al. (2010) | CE | Long-term | Two commercial cultivars | 400 | 30o/25oC |  425 | 7.8 to 10.2 | 9.0 **±** 0.9 |  |
| Ghaderi & Siosemardeh (2011) | Field | Short-term | Two commercial cultivars |  |  |  | 6.6 to 7.9 | 7.2 **±** 0.5 |  |
| Harbut et al. (2012) | CE | Long-term | Five wild species of *Fragaria* | 400 | 23oC | 1,800 | 11.8 to 21.9 | 15.2 **±** 0.8 |  |
| Harbut et al. (2012) | CE | Long-term | Nine commercial cultivars | 400 | 23oC | 1,800 |  | 11.8 **±** 0.7 |  |
| Harbut et al. (2012) | Field | Long-term | Three wild species of *Fragaria* | 400 | 23oC | 1,800 | 20.6 to 23.9 | 22.4 **±** 1.1 |  |
| Harbut et al. (2012) | Field | Long-term | Nine commercial cultivars | 400 | 23oC | 1,800 |  | 18.8 **±** 0.8 |  |
| Harbut et al. (2012) | CE | Long-term | Five wild species of *Fragaria* | 400 | 23oC | 1,800 | 13.3 to 19.0 | 16.1 **±** 0.8 |  |
| Harbut et al. (2012) | CE | Long-term | Nine commercial cultivars | 400 | 23oC | 1,800 |  | 13.1 **±** 0.7 |  |
| Harbut et al. (2012) | Field | Long-term | Three wild species of *Fragaria* | 400 | 23oC | 1,800 | 20.2 to 20.8 | 20.4 **±** 1.1 |  |
| Harbut et al. (2012) | Field | Long-term | Nine commercial cultivars | 400 | 23oC | 1,800 |  | 15.8 **±** 0.8 |  |
| Hidaka et al. (2015) | CE | Short-term | Four commercial cultivars | 400 | 25oC |  400 | 9.4 to 17.0 | 11.2 **±** 0.7 |  |
| Qi & Zhen (2016) | CE | Short-term | Three commercial cultivars | 385 | 28oC | 1,200 | 12.4 to 12.8 | 12.5 **±** 0.1 |  |
| Gao et al. (2017) | CE | Short-term | Haplotype A Diploid (*F. pentaphylla*) | 400 | 25oC | 1,000 |  | 14.8 **±** 0.5 | 0.038 **±** 0.003 |
| Gao et al. (2017) | CE | Short-term | Haplotype A Tetraploid (*F. moupinensis*) |  |  | 1,000 |  | 9.7 **±** 0.3 | 0.030 **±** 0.002 |
| Gao et al. (2017) | CE | Short-term | Haplotype B Diploid (*F. pentaphylla*) |  |  | 1,000 |  | 12.5 **±** 0.7 | 0.037 **±** 0.003 |
| Gao et al. (2017) | CE | Short-term | Haplotype B Tetraploid (*F. moupinensis*) |  |  | 1,000 |  | 10.9 **±** 0.4 | 0.032 **±** 0.001 |
| Garcia & Kubota (2017) | CE | Long-term | Two commercial cultivars | 400 | 21.5o to 26.5oC | 1,000 | 17.3 to 18.1 | 17.7 **±** 0.3  |  |
| Choi & Jeong (2020) | CE | Long-term | Two commercial cultivars |  | 30o/15oC | 1,000 | 5.0-12.3 | 9.3 **±** 1.0 |  |
| Lema-Rumińska et al. (2021) | CE | Long-term | Two commercial cultivars | 360 | 22oC |  600 | 5.0-5.8 | 5.4 **±** 1.1 |  |
| Lema-Rumińska et al. (2021) | CE | Long-term | *F. vesca* | 360 | 22oC |  600 | 7.1-7.2 | 7.2 **±** 1.0 |  |
| Kanno et al. (2022) | CE | Short-term | Seven commercial cultivars |  |  | 1,800 | 20.3 to 25.4 | 22.4 **±** 0.7 |  |
| Celiktopuz (2023) | Field | Long-term | Four commercial cultivars | 436-446 |  | 436 to 446 | 8.8-9.6 | 9.2 **±** 0.2 |  |

**Table S2. Effect of light on net CO2 assimilation in strawberry plants. Data from the sources indicated in the table. CE = controlled environment. PPF = photosynthetic photon flux. AMax = Maximum net CO2 assimilation per leaf area. AQY = Apparent quantum yield.**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Setup** | **Source** | **Duration** | **Genotype** | **CO2 (ppm)** | **Temperature** | **Min. PPF****(µmol/m2/s)** | **Max. PPF****(µmol/m2/s)** | **AMax****(µmol/m2/s)** | **PPF saturation value (µmol/m2/s)** | **AQY** |
| Chabot and Chabot (1977) | CE | Single leaf | Long-term | *F. vesca* |  | 25o/15oC |  0 |  650 |  2.9 |  500 |  |
| Chabot (1978) | CE | Single leaf | Long-term | *F. vesca* |  | 25o/15oC |  |  |  3.0 |  500 |  |
| Jurik et al. (1979) | CE | Single leaf | Long-term | *F. virginiana* |  | 25oC |  |  |  | 1,490 |  |
| Jurik et al. (1982) | CE | Single leaf | Long-term | *F. virginiana* |  | 25oC |  0 | 1,050 |  8.8 | 1,050 |  |
| Sruamsiri & Lenz (1985a) | CE | Single leaf | Short-term | Commercial |  |  |  |  | 11.7 | 1,000 |  |
| Campbell & Young (1986) | CE | Single leaf | Short-term | Commercial |  450 | 21oC | 200 |  800 | 25.0 |  700 |  |
| Ceulemans et al. (1986) | CE | Canopy | Short-term | Commercial | 1,000 | 15o/5oC |  0 |  400 |  8.6 |  467 |  |
| Ceulemans et al. (1986) | CE | Canopy | Short-term | Commercial | 1,000 | 15.5o/13.5oC |  0 | 1,000 |  6.5 |  833 |  |
| Feree & Stang (1988) | CE | Single leaf | Short-term | Commercial |  | 22oC |  0 | 1,600 |  9.8 |  600 |  |
| Van Elsacker et al. (1989) | CE | Single leaf | Short-term | Commercial |  | 20oC |  0 |  800 | 14.8 |  500 |  |
| Cameron & Hartley (1990) | CE | Single leaf | Short-term | *F. chiloensis* |  376 | 25.6oC |  0 | 2,200 | 21.4 | 2,200 | 0.038 |
| Cameron & Hartley (1990) | CE | Single leaf | Short-term | Commercial |  376 | 25.6oC |  0 | 2,200 | 14.6 | 2,200 | 0.030 |
| Sun & Chen (1991) | CE | Single leaf | Short-term | Commercial |  340 |  | 200 | 1,100 | 15.0 |  900 |  |
| Jeong et al. (1996) | CE | Single leaf | Long-term | Commercial |  | 20oC | 200 | 1,200 | 23.5 |  800 |  |
| Jeong et al. (1996) | CE | Single leaf | Long-term | Commercial |  | 20oC | 200 | 1,200 | 23.5 |  800 |  |
| Jeong et al. (1996) | CE | Single leaf | Long-term | Commercial |  | 20oC | 200 | 1,200 | 25.0 |  800 |  |
| Oda et al. (1997) | CE | Single leaf | Short-term | Commercial |  360 | 22o to 24oC |  0 | 1,656 |  7.7 |  552 |  |
| Yoshida & Morimoto (1997) | Field | Canopy | Short-term | Commercial |  450 |  |  0 | 2,300 | 10.0 | 1,150 |  |
| Le Mière et al. (1998) | CE | Single leaf | Short-term | Commercial |  | 12o to 25oC |  0 | 1,600 | 16.0 | 1,100 |  |
| Chi et al. (2001) | CE | Single leaf | Long-term | Commercial |  |  |  0 | 1,000 | 12.0 |  |  |
| Turechek et al. (2007) | CE | Single leaf | Short-term | Commercial |  | 22oC |  0 | 1,000 |  6.2 |  500 |  |
| Carlen et al. (2009) | Field | Single leaf | Short-term | Commercial |  | 26o to 34oC | 250 | 2,000 | 18.0 | 1,900 |  |
| Carlen et al. (2009) | Field | Single leaf | Short-term | Commercial |  | 26o to 34oC | 250 | 2,000 | 14.0 | 1,250 |  |
| Carlen et al. (2009) | Field | Single leaf | Short-term | Commercial |  | 26o to 34oC | 250 | 2,000 | 16.0 | 1,500 |  |
| Carlen et al. (2009) | Field | Single leaf | Short-term | Commercial |  | 26o to 34oC | 250 | 2,000 | 13.0 | 1,500 |  |
| Wada et al. (2010) | CE | Single leaf | Short-term | Commercial |  400 |  |  0 | 2,000 | 20.0 | 1,500 |  |
| Harbut et al (2012) | CE | Single leaf | Short-term | *F. moschata* |  400 | 23oC | 100 | 2,000 | 14.5 |  600 |  |
| Harbut et al (2012) | CE | Single leaf | Short-term | *F. nilgerrensis* |  400 | 23oC | 100 | 2,000 | 23.7 |  800 |  |
| Harbut et al (2012) | CE | Single leaf | Short-term | *F. nubicola* |  400 | 23oC | 100 | 2,000 | 15.1 |  600 |  |
| Harbut et al (2012) | CE | Single leaf | Short-term | *F. orientalis* |  400 | 23oC | 100 | 2,000 | 18.6 |  600 |  |
| Harbut et al (2012) | CE | Single leaf | Short-term | *F. vesca* |  400 | 23oC | 100 | 2,000 | 21.4 |  800 |  |
| Hidaka et al. (2013) | CE | Single leaf | Short-term | Commercial |  380 | 25oC |  0 | 1,200 | 12.2 |  600 |  |
| Li & Gao (2015) | Field | Single leaf | Short-term | Commercial |  360 | 25oC |  0 | 1,800 | 10.0 |  700 |  |
| Choi et al. (2016) | CE | Single leaf | Long-term | Commercial |  |  |  0 | 1,500 | 14.1 | 1,500 |  |
| Fuke et al (2016) | CE | Single leaf | Short-term | Commercial |  400 | 25oC |  0 | 1,450 | 12.0 |  900 |  |
| Kaiser & Janse (2016) | CE | Single leaf | Long-term | Commercial |  |  |  0 | 1,500 | 17.5 |  750 |  |
| Kaiser & Janse (2016) | CE | Single leaf | Long-term | Commercial |  |  |  0 | 1,500 | 19.5 |  750 |  |
| Gao et al. (2017) | CE | Single leaf | Short-term | *F. pentaphylla* |  400 | 25oC |  0 | 2,000 | 14.8 | 1,122 | 0.038 |
| Gao et al. (2017) | CE | Single leaf | Short-term | *F. pentaphylla* |  400 | 25oC |  0 | 2,000 | 12.5 | 1,070 | 0.037 |
| Gao et al. (2017) | CE | Single leaf | Short-term | *F.moupinensis* |  400 | 25oC |  0 | 2,000 | 9.7 | 1,048 | 0.030 |
| Gao et al. (2017) | CE | Single leaf | Short-term | *F.moupinensis* |  400 | 25oC |  0 | 2,000 | 10.9 |  994 | 0.032 |
| Jun et al. (2017) | Field | Single leaf | Short-term | Commercial |  400 | 25oC |  0 | 1,900 | 18.0 | 1,600 |  |
| Jun et al. (2017) | Field | Single leaf | Short-term | Commercial |  400 | 25oC |  0 | 1,900 | 16.5 | 1,600 |  |
| Mochizuki et al. (2019) | CE | Single leaf | Short-term | Commercial |  350 |  |  0 |  600 | 8.5 |  |  |
| Mochizuki et al. (2019) | CE | Single leaf | Short-term | Commercial |  350 |  |  0 |  600 | 9.8 |  |  |
| Mochizuki et al. (2019) | CE | Single leaf | Short-term | Commercial |  350 |  |  0 |  600 | 9.8 |  |  |
| Li et al. (2020) | CE | Single leaf | Short-term | Commercial |  400 | 25oC |  20 | 1,800 | 17.1 | 1,379 | 0.030 |
| Mattson et al. (2020) | CE | Single leaf | Short-term | Commercial |  400 |  |  50 | 2,000 |  4.4 |  500 |  |
| Mattson et al. (2020) | CE | Single leaf | Short-term | Commercial |  675 |  |  50 | 2,000 |  5.6 | 1,000 |  |
| Mattson et al. (2020) | CE | Single leaf | Short-term | Commercial |  950 |  |  50 | 2,000 | 10.0 | 1,500 |  |
| Mattson et al. (2020) | CE | Single leaf | Short-term | Commercial | 1,225 |  |  50 | 2,000 | 13.4 | 2,000 |  |
| Doddrell (2021) | Field | Single leaf | Short-term | Commercial |  |  |  0 | 1,500 | 16.8 | 1,250 |  |
| Le et al. (2021a) | CE | Single leaf | Short-term | Commercial | 1,200 | 25oC |  0 | 2,000 | 30.0 | 1,600 |  |
| Le et al. (2021a) | CE | Canopy | Short-term | Commercial |  400 | 23oC | 200 | 1,500 | 18.0 | 1,000 |  |
| Le et al. (2021b) | CE | Single leaf | Short-term | Commercial | 1,200 | 25oC |  0 | 2,000 | 17.0 | 1,200 |  |
| Rivero et al. (2021) | CE | Single leaf | Short-term | Commercial |  400 | 9oC |  0 | 1,000 | 7.6 |  500 | 0.055 |
| Rivero et al. (2021) | CE | Single leaf | Short-term | Commercial |  400 | 15oC |  0 | 1,000 | 14.0 | 1,000 | 0.064 |
| Rivero et al. (2021) | CE | Single leaf | Short-term | Commercial |  400 | 21oC |  0 | 1,000 | 12.8 | 1,000 | 0.058 |
| Rivero et al. (2021) | CE | Single leaf | Short-term | Commercial |  400 | 27oC |  0 | 1,000 | 13.0 | 1,000 | 0.061 |
| Wu et al. (2021) | CE | Single leaf | Short-term | Commercia; |  380 | 30o/20oC |  0 | 2,000 | 13.0 |  492 |  |
| Chen et al. (2022) | CE | Single leaf | Long-term | Commercial | 200 to 1,500 | 18o to 32oC | 100 | 2,000 | 6.9 | 1,500 |  |
| Tagawa et al. (2022) | CE | Single leaf | Short-term | Commercial |  400 | 20oC |  0 | 1,500 | 15.5 | 1,000 |  |
| Kimura et al. (2023) | CE | Single leaf | Long-term | Commercial | 400 to 1,600 | 20o to 35oC | 128 |  820 | 10.2 |  563 |  |

**Table S3.**  **Effect of the concentration of CO2 on net CO2 assimilation in strawberry plants. Data from the sources indicated in the table and were collected from commercial strawberry under controlled-environmental conditions. PPF = photosynthetic photon flux. AMax = Maximum net CO2 assimilation per leaf area. Ca = concentration of CO2 in the atmosphere. Ci = concentration of CO2 in the leaf. Cc = concentration of CO2 in the chloroplast.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Source** | **Duration** | **PPF****(µmol/m2/s)** | **Temperature** | **Measurement of CO2** | **Min. CO2****(ppm)** | **Max. CO2****(ppm)** | **AMax****(µmol/m2/s)** | **CO2 saturation value****(ppm)** |
| Campbell & Young (1986) | Leaves | Short-term |  800 | 32oC | Ca | 300 |  600 | 40.0 |  |
| Van Elsacker et al. (1989) | Leaves | Short-term |  700 | 20oC | Ca | 180 | 1,000 | 22.7 |  600 |
| Sung & Chen (1991) | Leaves | Long-term | 1,200 |  | Ci |  0 |  600 | 32.5 |  650 |
| Jeong et al. (1996) | Leaves | Long-term | 1,200 | 20oC | Ca |  50 | 2,000 | 35.0 |  900 |
| Jeong et al. (1996) | Leaves | Long-term | 1,200 | 20oC | Ca |  50 | 2,000 | 38.0 |  900 |
| Jeong et al. (1996) | Leaves | Long-term | 1,200 | 20oC | Ca |  50 | 2,000 | 35.0 |  900 |
| Chen et al. (1997) | Leaves | Long-term | 1,800 | 25o/20oC | Ca | 300 |  900 |  9.7 |  600 |
| Keutgen et al. (1997) | Leaves | Long-term |  450 | 24oC | Ca | 300 |  900 |  9.0 |  600 |
| Oda (1997) | Leaves | Short-term |  552 | 23oC | Ca |  50 |  350 |  9.3 |  |
| Yoshida & Morimoto (1997) | Canopy | Long-term |  460 |  | Ca | 250 | 2,250 | 16.4 | 1,000 |
| Yoshida & Morimoto (1997) | Canopy | Long-term |  460 |  | Ca | 250 | 2,250 | 22.7 | 1,750 |
| Su et al. (2002) | Leaves | Short-term | 1,000 |  | Ci |  0 | 1,000 | 19.5 |  943 |
| Keutgen et al. (2005) | Leaves | Short-term |  800 | 25oC | Ci |  0 | 1,100 | 28.0 |  700 |
| Keutgen et al. (2005) | Leaves | Short-term |  800 | 25oC | Ci |  0 | 1,100 | 34.0 |  850 |
| Xu et al. (2006) | Leaves | Long-term | 1,000 | 25oC | Ci |  50 |  600 |  4.8 |  400 |
| Xu et al. (2006) | Leaves | Long-term | 1,000 | 25oC | Ci |  50 |  600 |  8.8 |  500 |
| Xu et al. (2006) | Leaves | Long-term | 1,000 | 25oC | Ci |  50 |  600 |  18.0 |  505 |
| Wada et al. (2010) | Leaves | Short-term | 1,000 | 20oC | Ca |  0 | 2,000 | 40.0 |  900 |
| Rho et al. (2011) | Leaves | Short-term | 1,200 | 20oC | Ci |  50 | 2,200 | 29.0 | 1,000 |
| Li & Gao (2015) | Leaves | Short-term | 1,500 | 25oC | Ca |  0 | 1,200 | 34.0 |  600 |
| Hidaka et al. (2016) | Leaves | Long-term |  500 | 25oC | Ca | 200 | 2,000 | 39.5 | 1,000 |
| Hidaka et al. (2016) | Leaves | Long-term |  400 | 30oC | Ca | 200 | 2,000 | 26.5 | 1,450 |
| Kaiser & Janse (2016) | Leaves | Long-term |  |  | Ca |  50 | 2,000 | 22.5 | 1,100 |
| Kaiser & Janse (2016) | Leaves | Long-term |  |  | Ca |  50 | 2,000 | 30.0 | 1,100 |
| Jun et al. (2017) | Leaves | Short-term | 1,200 | 25oC | Ca |  0 | 1,400 | 32.8 | 1,400 |
| Jun et al. (2017) | Leaves | Short-term | 1,200 | 25oC | Ca |  0 | 1,400 | 26.7 | 1,200 |
| Chen et al. (2022) | Leaves | Short-term | 100 to 2,000 | 18o to 32oC | Ca | 200 | 1,500 |  6.8 |  800 |
| Tagawa et al. (2022) | Leaves | Long-term | 1,000 | 20oC | Ca |  0 | 2,000 | 31.0 | 1,000 |
| Yu et al. (2023) | Leaves | Long-term | 1,000 | 20o/15oC | Ci |  50 | 1,300 | 30.0 |  900 |
| Yu et al. (2023) | Leaves | Long-term | 1,000 | 20o/15oC | Ci |  50 | 1,300 | 24.5 |  600 |
| Yu et al. (2023) | Leaves | Long-term | 1,000 | 25o/20oC | Ci |  50 | 1,000 | 28.5 |  780 |
| Yu et al. (2023) | Leaves | Long-term | 1,000 | 25o/20oC | Ci |  50 | 1,000 | 21.5 |  410 |
| Yu et al. (2023) | Leaves | Long-term | 1,000 | 20o/15oC | Ci |  50 | 1,300 | 29.0 | 1,080 |
| Yu et al. (2023) | Leaves | Long-term | 1,000 | 20o/15oC | Ci |  50 | 1,300 | 25.0 |  650 |

**Table S4.** Effect of temperature on net CO2 assimilation in the leaves of strawberry. Information from the quadratic regression between net CO2 assimilation and temperature is presented. Data are from the studies indicated in the table. All the responses to temperature were quadratic, except for Xu et al. (2021) which was linear.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Type of experiment** | **Range in day temperature** | **Range in net CO2 assimilation****(µmol per m2 per s)** | ***P* value from quadratic or linear regression** | ***R*2 value from quadratic or linear regression** | **Optimum temperature range for net CO2 assimilation** |
| Chabot & Chabot (1977) | Growth chamber | 10o to 35oC | 2.2 to 4.3 | < 0.001 | 0.98 | 15o to 30oC |
| Chabot & Chabot (1977) | Growth chamber | 10o to 35oC | 4.4 to 6.7 | 0.019 | 0.88 | 15o to 30oC |
| Chabot & Chabot (1977) | Growth chamber | 10o to 35oC | 3.0 to 5.2 | 0.001 | 0.98 | 25o to 35oC |
| Sruamsiri & Lenz (1985a) | Growth chamber | 10o to 30oC (different RH) | 9.1 to 12.1 | 0.004 | 0.99 | 10o to 20oC |
| Sruamsiri & Lenz (1985a) | Growth chamber | 1.9o to 14.0oC (different RH) | 9.5 to 11.3 | 0.014 | 0.97 | 6o to 12oC |
| Oda (1997) | Leaf chamber | 13.1o to 33.4oC | 5.4 to 10.3 | 0.037 | 0.93 | 25o to 33oC |
| Bunce (2001) | Field | 19.0o to 37.9oC | 5.5 to 21.7 | < 0.001 | 0.74 | 19o to 31oC |
| Carlen et al. (2009) | Tunnel | 19.8o to 39.7oC | 10.1 to 18.6 | < 0.001 | 0.96 | 25o to 35oC |
| Carlen et al. (2009) | Tunnel | 19.8o to 42.0oC | 5.1 to 13.1 | < 0.001 | 0.93 | 25o to 35oC |
| Carlen et al. (2009) | Tunnel | 17.0o to 42.0oC | 7.3 to 17.6 | 0.002 | 0.85 | 25o to 35oC |
| Carlen et al. (2009) | Tunnel | 16.8o to 39.7oC | 6.7 to 12.7 | 0.021 | 0.70 | 25o to 35oC |
| Wada et al. (2010) | Glasshouse | 10o to 30oC | 15.9 to 21.9 | 0.037 | 0.93 | 15o to 30oC |
| Wada et al. (2010) | Glasshouse | 10o to 30oC | 21.1 to 39.2 | 0.080 | 0.98 | 20o to 30oC |
| Li & Gao (2015) | Glasshouse | 10o to 40oC | 2.5 to 10.0 | - | - | 18o to 24oC |
| Jun et al. (2017) | Growth chamber | 19o to 31oC | 12.7 to 19.4 | < 0.001 | 0.97 | 27o to 31oC |
| Jun et al. (2017) | Growth chamber | 19o to 31oC | 11.8 to 14.5 | < 0.001 | 0.96 | 25o to 31oC |
| Xu et al. (2021) | Greenhouse | 32o to 41oC | 6.7 to 14.6 | 0.041 | 0.88 | Not determined (linear decrease) |

**Table S5. Effect of nitrogen on net CO2 assimilation or net assimilation rate (NAR) in strawberry plants. Data from the sources indicated in the table. CE = controlled environment. PPF = photosynthetic photon flux. A = Net CO2 assimilation per leaf area. s.e. = standard error.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Setup** | **Duration** | **Genotypes** | **PPF****(µmol/m2/s)** | **CO2** | **Temperature** | **Range in nitrogen levels** | **Mean AMax (± s.e.) or NAR** |
| Jurik et al. (1982) | CE | Short-term | Single cultivar of *F. virginiana* | 1,010 |  | 25oC | 0 or 212 mg N/week | A = 12.1 **±** 1.3 mg/g/h at N0 & 31.1 ± 6.7 mg/g/h at N212 |
| Moon et al. (1990) | CE | Short-term | Two cultivars of *F. chiloensis* | 1,400 to 1,600 |  | 20oC | Leaf N from 50 to 250 mmol/m2 | Linear correlations between A & Leaf N (*r* = 0.96 or 0.92) |
| Deng & Woodward (1998) | CE | Long-term | Single commercial cultivar |  | 390 ppm | Mean of 17oC | Solution N from 0.04 to 4.0 mmol/L | NAR = 14.9 **±** 1.9 g/m2/d at N0.04 and 7.40 **±** 0.7 g/m2/d at N4.0 |
| Deng & Woodward (1998) | CE | Long-term | Single commercial cultivar |  | 560 ppm | Mean of 17oC | Solution N from 0.04 to 4.0 mmol/L | NAR = 19.8 **±** 2.8 g/m2/d at N0.04 and 10.4 **±** 1.0 g/m2/d at N4.0 |
| Claussen & Lenz (1999) | Field | Long-term | Single commercial cultivar |  650 | 350 ppm | 24oC | 6.6 to 7.2 mmol NO3-N/L or 3.5 to 4.2 mmol NH4-N/L  | A = 6.0 µmol/m2/s with NO3-N & 2.0 µmol/m2/s with NH4-N |
| Tabatabaei et al. (2006) | CE | Short-term | Two commercial cultivars | 1,500 |  |  | NH4:NO3 ratios of 0.1 to 75 | A ranged from 6.0 to 8.0 µmol/m2/s |
| Xu et al. (2006) | CE | Short-term | Single commercial cultivar |  | 390 ppm |  | Solution N from 0.4 to 12.0 mmol/L | A = 6.1 **±** 0.4 µmol/m2/s at N0.4, 8.1 **±** 0.3 µmol/m2/s at N4.0, & 10.2 **±** 0.5 µmol/m2/s at N12 |
| Xu et al. (2006) | CE | Short-term | Single commercial cultivar | 1,000 | 700 ppm | 25oC | Solution N from 0.4 to 12.0 mmol/L | A = 6.1 **±** 0.4 µmol/m2/s at N0.4, 8.1 **±** 0.3 µmol/m2/s at N4.0, & 10.2 **±** 0.5 µmol/m2/s at N12 |
| Xu et al. (2007) | CE | Short-term | Single commercial cultivar | 1,000 | 390 ppm | 25oC | Solution N from 0.4 to 12.0 mmol/L | A = 6.1 **±** 0.4 µmol/m2/s at N0.4 & 10.2 **±** 0.5 µmol/m2/s at N12 |
| Xu et al. (2007) | CE | Short-term | Single commercial cultivar |  | 700 ppm |  | Solution N from 0.4 to 12.0 mmol/L | A = 8.6 **±** 0.4 µmol/m2/s at N0.4 & 14.6 **±** 0.6 µmol/m2/s at N12 |
| Acuña-Maldonado & Pritts (2008) | CE | Short-term | Single commercial cultivar | 1,700 | 360 ppm | 21.7oC | Solution N from 0 to 20 mmol/L | A = 7.0 µmol/m2/s at N0 & 11.0 µmol/m2/s at N10 to N20 |
| Li et al. (2013) | Field | Long-term | Single commercial cultivar |  |  |  | N applications from 0 to 20 kg/ha | A = 22.4 µmol/m2/s at N0 & 26.9 to 32.6 µmol/m2/s at N5 to N20 |
| Han et al. (2015) | CE | Short-term | Single commercial cultivar | 1,200 | 380 ppm | 30oC | Solution N from 3.6 to 36.1 mmol/L | A = 13.0 **±** 0.5 µmol/m2/s at N3.6 & 4.2 **±** 0.3 µmol/m2/s at N36.1 |
| Paul (2021) | CE | Long-term | Single commercial cultivar |  |  | 25oC | Solution N from 3.6 to 10.7 mmol/L | A similar across N treatments |
| Yenni et al. (2021) | Field | Short-term | Single commercial cultivar |  |  |  | N applications of 0 or 92 kg/ha | A = 14.3 **±** 0.3 µmol/m2/s at N0 & 16.0 **±** 0.2 µmol/m2/s at N92 |

**Table S6. Effect of leaf age on net CO2 assimilation in strawberry plants. Data from the sources indicated in the table. All the studies were conducted under controlled-environment conditions. PPF = photosynthetic photon flux. A = Net CO2 assimilation per leaf area. s.e. = standard error.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Treatments** | **Genotype** | **CO2 (ppm)** | **Temperature** | **PPF****(µmol/m2/s)** | **Mean AMax (± s.e.)** |
| Jurik et al. (1979) | Leaves 7 to 47 days old | *F. virginiana* |  | 25oC | 1,490 | Maximum values achieved with Leaf17 to Leaf27 |
| Chen et al. (1997) | Leaves 20 to 60 days old | Commercial | 600 | 25o/20oC | 1,800 | Leaf20 = 6.0 **±** 0.2, Leaf40 = 11.5 **±** 0.2, & Leaf60 = 10.4 **±** 0.3 µmol/m2/s |
| Keutgen et al. (1997) | Leaves 21 to 63 days old | Commercial | 600 | 24oC |  450 | Leaf21 = 6.8 **±** 1.4, Leaf 42 = 11.3 **±** 0.4, & Leaf63 = 9.04 **±** 2.6 µmol/m2/s |
| Drogoudi & Ashmore (2000) | Fully-expanded leaves 1, 3 or 4 | Commercial |  | 20oC | 1,100 | Leaf1 = 11.9 **±** 0.0, Leaf 3 = 10.9 **±** 0.1, & Leaf4 = 10.9 **±** 0.7 µmol/m2/s |
| Carlen et al. (2009) | Leaves 10 to 30 days old | Commercial |  | 26o to 34oC | 2,000 | Leaf10 = 13.5 **±** 1.0, Leaf 20 = 16.2 **±** 0.5, & Leaf 30 = 13.3 **±** 0.2 µmol/m2/s |
| Li & Gao (2015) | Leaves 5 to 65 days old | Commercial | 1200 | 18o to 24oC | 1,500 | Leaf 5 = 11.0, Leaf 15 =34.0, Leaf 30 = 32.5, & Leaf 65 =20.0 µmol/m2/s |
| Fuke et al. (2016) | Fully-expanded leaves 1, 3 or 5 | Commercial | 400 | 25oC | 1,500 | Leaf1 = 11.5, Leaf 3 = 14.2, & Leaf 5 = 12.2 µmol/m2/s |
| Kaiser & Janse (2016) | Young or old leaves | Commercial | 400 |  | 1,500 | Young leaves = 20, & Old leaves = 19.5 µmol/m2/s  |
| Le et al. (2021a) | Leaves 1 to 21 days old | Commercial | 400 | 23oC | 1,500 | Leaf3 = 26.0, Leaf9 = 27.5, Leaf12 = 28.0, & Leaf21 = 23.5 µmol/m2/s |

**Table S7. Effect of fruiting on net CO2 assimilation in strawberry plants. Data from the sources indicated in the table and were collected from commercial strawberry under controlled-environmental conditions. PPF = photosynthetic photon flux. AMax = Maximum net CO2 assimilation. s.e. = standard error.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Treatments** | **Type of sample** | **No. of measurements** | **CO2 (ppm)** | **Temperature** | **PPF****(µmol/m2/s)** | **Ratio of AMax****(Non-fruiting/Fruiting)** |
| Hoffmann & Lenz (1974) | Fruiting & non-fruiting plants | Leaves | Twelve | 400 | 25o/18oC |  437 | 1.02 |
| Choma et al. (1982) | Fruiting & non-fruiting plants | Whole plant | Six |  | 29oC |  900 | 0.84 |
| Forney & Breen (1985) | Fruiting & non-fruiting plants | Leaves | Eight |  | 30o/18oC | 400 to 600 | 0.71 |
| Sruamsiri & Lenz (1985b) | Fruiting & non-fruiting plants | Leaves | Five | 300 to 900 | 20oC | 1,035 | 0.81 |
| Sruamsiri & Lenz (1985b) | Fruiting & non-fruiting plants | Leaves | Four | 300 | 10o to 30oC | 1,035 | 0.81 |
| Sruamsiri & Lenz (1985b) | Fruiting & non-fruiting plants | Leaves | Four | 300 | 20oC | 138 to 1,150 | 0.83 |
| Sruamsiri & Lenz (1985b) | Fruiting & non-fruiting plants | Leaves | Twelve | 300 | 20oC | 1,035 | 0.76 |
| Schaffer et al. (1986a) | Fruiting & non-fruiting plants | Young leaves | Nine |  | 28oC |  900 | 0.86 |
| Schaffer et al. (1986a) | Fruiting & non-fruiting plants | Old leaves | Nine |  | 28oC |  900 | 1.02 |
| Schaffer et al. (1986a) | Fruiting & non-fruiting plants | Old leaves | Six |  | 28oC |  900 | 0.91 |
| Schaffer et al. (1986b) | Fruiting & non-fruiting plants | Whole plant | Six |  | 30oC |  900 | 1.27 |
| Drogoudi & Ashmore (2000) | Fruiting & non-fruiting plants | Young leaves | Three |  | 20oC | 1,100 | 0.94 |

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