Cibus Announces New Publication: Industrial Scale Gene Editing in Brassica napus

November 30, 2023

- ***In the peer reviewed publication, the International Journal of Plant Biology, Cibus provides two case studies of improving oleic oil content and developing pod shatter reduction in Brassica napus (canola, winter oilseed rape) by using gene editing tools on an industrial scale***

SAN DIEGO, Nov. 30, 2023 (GLOBE NEWSWIRE) -- Cibus, Inc. (NASDAQ: CBUS), a leading agricultural technology company that develops and licenses plant traits to seed companies, today announced that its paper on *Industrializing Gene Editing in Brassica napus* was published in the *International Journal of Plant Biology*. (**Link Article:** https://www.mdpi.com/2037-0164/14/4/77)

"The ability to scale breeding in a precise and repeatable process is the central breakthrough of our high-speed breeding process, which we refer to as the Trait Machine™ System. Our scale breakthroughs in breeding in*Brassica napus* (canola or winter oilseed rape) in our San Diego trait production facility is driving the speed and number of edited seed transfers of our pod shatter reduction trait to our major seed company customers," stated Andrew Walker, Vice President of Trait Production at Cibus. "While we focus on our initial three-crop, five-trait model, our continued breakthroughs developing additional single cell regeneration systems in multiple crops is expanding our ability to bring new scaled breeding processes and new trait opportunities to more crops in the future, especially the major oil and cereal crops."

Peter Beetham, President and COO of Cibus, added, "Increased throughput of our Trait Machine allows Cibus to deliver multiple elite genetic lines to seed company customers that integrate into their advanced commercial breeding programs. This high-speed approach reduces timelines to develop new traits from as much as 16 years to approximately three to five years, which has been validated by collaboration agreements with partners, such as Bayer."

Article Abstract
In plants, an increasing number of traits and new characteristics are being developed using gene editing. Simple traits represented by a single gene can be managed through backcross breeding, but this is typically not the case for more complex traits which may result from the function of a large number of genes. Here, we demonstrate two case studies of improving oleic oil content and developing pod shatter reduction in *Brassica napus* by using gene editing tools on an industrial scale. There are four *BnaFAD2* genes involved in oleic oil content and eight *BnaSHP* genes involved in pod shatter tolerance. In order to develop these two traits, we delivered nuclease ribonucleoproteins with Gene Repair Oligonucleotides (GRONs) into protoplasts, with subsequent regeneration into plants on an industrial scale, which encompassed robust tissue culture protocols, efficient gene editing, robotics sampling, and molecular screening, vigorous plant regeneration, growth, and phenotyping. We can produce precise loss-of-function-edited plants with two improved agronomically important complex traits, high oleic oil or pod shatter reduction, in elite canola varieties within 1–3 years, depending on the trait complexity. In the edited plants carrying loss of function of four *BnaFAD2* genes, the seed fatty acid oleic acid content reached 89% compared to 61% in the non-edited wildtype control. The plants carrying eight edited *BnaSHP* genes achieved 51% pod shatter reduction in multiple year field testing in the target environment compared to the wildtype control.

About the Cibus *RTDS*®-based High Throughput Breeding System
A key element of Cibus' technology breakthrough is its high throughput breeding process (referred to as the Trait Machine™ System). The Trait Machine process is a crop specific application of Cibus' patented Rapid Trait Development System™ (***RTDS***). The proprietary technologies in ***RTDS*** integrate crop specific cell biology platforms with a series of gene editing technologies to enable a system of end-to-end crop specific precision breeding. It is the core technology platform for Cibus' Trait Machine: the first standardized end-to-end semi-automated crop specific gene editing system that directly edits a seed company's elite germplasm. Each Trait Machine process requires a crop specific cell biology platform that enables Cibus to edit a single cell from a customers' elite germplasm and grow that edited cell into a plant with the Cibus edits. Cibus has Trait Machine platforms developed for canola and rice and has already begun transferring back to customers their elite germplasm with Cibus edits.

The traits from Cibus' ***RTDS***-based high throughput breeding system are indistinguishable from traits developed using conventional breeding or from nature. Under the European Commission's current proposal, if adopted, we expect that products from Cibus' ***RTDS*** gene editing platform such as its pod shatter trait and *Sclerotinia* resistance traits for canola and winter oilseed rape will be considered 'conventional-like'.

Cibus believes that ***RTDS*** and the Trait Machine process represent the technological breakthrough in plant breeding that is the ultimate promise of plant gene editing: high throughput gene editing systems operating as an extension of seed company breeding programs.

About Cibus

Cibus is a leader in gene edited productivity traits that address critical productivity and sustainability challenges for farmers such as diseases and pests which the United Nations estimates cost the global economy approximately $300 billion annually. Cibus is not a seed company. It is a technology company that uses gene editing to develop and license traits to seed companies in exchange for royalties on seed sales. Cibus' focus is productivity traits for the major global crops such as canola, rice, soybean, and wheat. Cibus is the technology leader in high throughput gene editing technology that enables Cibus to develop and commercialize plant traits at a fraction of the time and cost of conventional breeding. Using its Trait Machine process, Cibus has developed a pipeline of five productivity traits including important traits for pod shatter reduction, *Sclerotinia* resistance and weed management. Three crops: canola, rice, and soybean; with Cibus' five traits: pod shatter reduction, herbicide tolerance (HT)1, HT2, HT3, and *Sclerotinia* resistance make up the core of Cibus' three-crop, five-trait model, which is the central focus of its business. Its initial traits for pod shatter reduction and weed management are developed in collaboration with leading seed companies. Its other pipeline traits including *Sclerotinia* resistance are in advanced greenhouse and field trial stages.

Forward-Looking Statements
This press release contains "forward-looking statements" within the meaning of applicable securities laws, including The Private Securities Litigation Reform Act of 1995. All statements, other than statements of present or historical fact included herein, including statements regarding Cibus' strategy, future operations, prospects and plans, are forward-looking statements. Forward-looking statements may be identified by words such as "anticipate," "believe," "intend", "expect," "plan," "scheduled," "could," "would" and "will," or the negative of these and similar expressions.

These forward-looking statements are based on the current expectations and assumptions of Cibus' management about future events, which are based on currently available information. These forward-looking statements are subject to numerous risks and uncertainties, many of which are difficult to predict and beyond the control of Cibus. Cibus' actual results, level of activity, performance, or achievements could be materially different than those expressed, implied, or anticipated by forward-looking statements due to a variety of factors, including, but not limited to: risks associated with the possible failure to realize certain anticipated benefits of the merger between Cibus Global, LLC and Calyxt, Inc. (Merger Transactions); the effect of the completion of the Merger Transactions on Cibus' business relationships, operating results, and business generally; the outcome of any litigation related to the Merger Transactions; changes in expected or existing competition; challenges to Cibus' intellectual property protection and unexpected costs associated with defending intellectual property rights; increased or unanticipated time and resources required for Cibus' platform or trait product development efforts; Cibus' reliance on third parties in connection with its development activities; challenges associated with Cibus' ability to effectively license its productivity traits and sustainable ingredient products; the risk that farmers do not recognize the value in germplasm containing Cibus' traits or that farmers and processors fail to work effectively with crops containing Cibus' traits; challenges that arise in respect of Cibus' production of high-quality plants and seeds cost effectively on a large scale; Cibus' need for additional funding to finance its activities and challenges in obtaining additional capital on acceptable terms, or at all; Cibus' dependence on distributions from Cibus Global, LLC to pay taxes and cover its corporate and overhead expenses; regulatory developments that disfavor or impose significant burdens on gene-editing processes or products; Cibus' ability to achieve commercial success; commodity prices and other market risks facing the agricultural sector; technological developments that could render Cibus' technologies obsolete; changes in macroeconomic and market conditions, including inflation, supply chain constraints, and rising interest rates; dislocations in the capital markets and challenges in accessing liquidity and the impact of such liquidity challenges on Cibus' ability to execute on its business plan; and other important factors discussed in "Risk Factors of Cibus, Inc." filed as Exhibit 99.3 with Cibus' Current Report on Form 8-K, which was filed with the Securities and Exchange Commission (the "SEC") on June 1, 2023, and any additional "Risk Factors" identified in Cibus' subsequent reports on Forms 10-Q and 8-K filed with the SEC. Should one or more of these risks or uncertainties occur, or should underlying assumptions prove incorrect, actual results and plans could differ materially from those expressed in any forward-looking statements.

In addition, the forward-looking statements included in this press release represent Cibus' views as of the date hereof. Cibus specifically disclaims any obligation to update such forward-looking statements in the future, except as required under applicable law. These forward-looking statements should not be relied upon as representing Cibus' views as of any date subsequent to the date hereof.

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Source: Cibus US LLC